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Methods of Preparing Pulverized Coal*

Descriptions of Approved Devices for Crushing, Pulverizing, Drying, Handling, Cleaning, Weighing and Ventilating

BY JOSEPH F. SHADGEN

EXPERIENCE has proved that the pulverization of fuel is economical and commercially successful only when concentrated in fair-sized installations. The main function of a powdered fuel plant are *a*, the crushing and pulverization; *b*, the drying or dehydrating of the fuel.

Incidental are the operations solving the following problems: 1—Handling, including unloading, feeding, elevating and transporting. 2—Cleaning and checking through magnetic separators and automatic scales and recorders. 3—Ventilating for the safeguard of the health of the operator and as guaranty against dust explosions.

The concentration of all these operations in one plant designed for efficient running and located with due consideration to the specific conditions and local peculiarities incurs an additional problem very important in itself and greatly discussed lately.

Since powdered coal was born commercially in the cement plants, the first installations were strongly influenced by the experience in that industry. The data given by the pulverization of shales and limestones were simply transposed and the same machines installed. The problem of distributing the coal powder hardly existed because the kilns were located close to the crushing plant and the number of burners was limited.

The Lebanon installation with its varied metallurgical applications—open-hearth and pit furnaces, forge fires and heating furnaces—gave a great impetus to the new industry and caused the manufacturers to evolve independently. Since 1912 the powdered coal plants have presented distinctive features as to the machinery installed, and the considerable efforts, focused on the distribution of coal powder, produced very satisfactory solutions. The efficiency of the pulverizing plant will be the heart of the whole question; the whole future of this art of burning solid fuels will depend on its economic operation. Improvements will only broaden the fields of application.

Crushing and Pulverizing

The science of crushing and grinding forms the foundation of many basic industries like mining, ore dressing, manufacture of cement, etc. Hand, hammer and iron stones have long given way to special machines developed for mechanical drive and continuous operation. The importance of the problem is clearly shown by the painstaking and thorough investigations on the subject, published in all languages of which the classic books of R. H. Richards are the most complete and the most interesting.

The experience of the whole crushing and grinding industry for minerals of all kinds has taught: That the grinding of any material has to be done stepwise to be efficient and economical; that the choice of the machine best suited for each step depends on the hardness of the material to be crushed or pulverized.

By grinding, the cohesive forces of the material are brutally smashed and the solid is split up into smaller lumps; in non-fibrous mineral the hardness usually expresses the value of these binding forces that have to be overcome. Hard, gritty stones like trap rock are more difficult to crush than soft material like limestone, whose molecular attractions are weaker.

Coal is a mineral, heterogeneous compound, composed mainly of carbon mixed with impurities such as shales, pyrites, silicates, etc. These foreign matters that produce the ashes on the grates are harder than the combustible matter. Consequently, all crushers and pulverizers have to exert pressure high enough to annihilate the cohesion of both carbon and impurities, and have to be built to resist the greater wearing action of these mineral impurities, particularly in the case of centrifugal pulverizers.

The particular structure of the coal veins and cleavage texture of most mineral fuels simplifies the mining and makes it possible to deliver, without great difficulties at the head of any pit, so-called "run of mine" coal, a mixture of big and small lumps of all sizes and forms with dust and powder. A large amount of coal is sold in that form. If it contains too many impurities it may be profitable to size, or wash, or clean it according to the habits of the trade, prescriptions of the user, or economies of transportation.

Preliminary Crushing

The first step is crushing to uniform size, done very efficiently by three kinds of machines, one of which is the roll crusher. These machines consist of a sturdy frame with one, two or four rolls turning at low speed; the rolls may be plain, grooved or toothed cylinders of various diameters and lengths to suit the output. They are made by a score of manufacturers in more or less perfected constructions, and deliver coal in uniform sizes from 1 in. to 1½ in. lumps, down to buckwheat or barley, according to the number of the rolls. The coal drops from the feeder between the rolls, which turn in opposite directions, and is crushed by the direct

*Copyright, 1920, by Joseph F. Shadgen. The author is an engineer now engaged in rolling mill work in the United States, and wrote "Status of the Powdered Fuel Problem" in THE IRON AGE of Jan. 1.

pressure of the rolls, which pressure is regulated by springs acting against the bearings of the rolls. The operation is continuous because the coal is drawn into the machine by the rotation of the rolls and drops by gravity into the delivery chute. This preliminary crushing is very inexpensive, the machines are cheap, the wear of the rolls is practically negligible, the power consumed is small and the capacity of production is enormous even for the smaller sizes. An adequate feeding device ought to guarantee a positive flow of coal, to reduce the idle running, and the foundations ought to be solid to avoid vibrations and shocks.

A second type is the hammer crusher. These machines are sometimes used for preliminary crushing and can be fed by any run of mine having lumps of 4 in. and less. They deliver the product in a finer state, sometimes 80 to 90 per cent, through a 20-mesh screen. These machines imitate the action of the hammer, where the impact of the blow, and not the pressure, smashes the material, tearing apart the cohesive forces.

Hammer crushers are usually formed by an anvil-plate, a series of hammers mounted on the spider of a shaft turning at high speed, a grid screen regulating the size of the output, and a feeding device. As a crusher for coal and material not too high in silica these machines are extremely efficient, if designed correctly according to the principles of the impact hammer blow. Unfortunately, constructive difficulties have handicapped many machines on the market and the type is not popular. In fact very few makers have recognized the real value of the high speed of the hammers and the importance of their weight in spite of the well-known mechanical law that the impact effect grows with the square of the velocity and is in direct proportion to the mass of the hammer. The fantastic so-called "X-ray" pictures and advertising sketches, circulated by the trade, prove the better selling imagination, but also the low engineering level of makers and give a very poor testimonial about the scientific knowledge of the buyer.

Ball mills are the third kind of machines used for preliminary crushing. Their action is based on the constant rubbing, pounding and dropping of the coal lumps against themselves and against steel balls, of sizes varying from 3 in. to 6 in. in diameter within a steel-plate drum, lined with segments of any material resisting wear and tear. Ball mills are slow rotating machines (20 to 35 r.p.m.), of great weight and provided with suitable feeders and discharge spouts. They grind any material from 3 in. to 2 in. lumps down to a mixture passing through the 20-mesh sieve. The diameters of the drum barrel vary from 4 to 8 ft., according to the capacity, and their lengths range from 3 to 7 ft., according to the nature of the mineral to be crushed. These ball mills are very suitable for hard ores and rock such as silica stones, trap rock and porphyry minerals, and they have given best results for coal of all kinds. Their low speed makes the operation very reliable and their service very sure and foolproof. Most of the makes on the market are equivalent and present practically no differences in design. The only factor of real importance seems to be the weight of the charge of balls.

Final Pulverization

The main operation in a powdered fuel plant is the final pulverization of the combustible, the production of a fine impalpable powder and dust of a constantly uniform degree of fineness. The machines used have not only to pulverize but also to guarantee a constant uniform grind which requires an automatic sifting. Two types of mills on different principles only solve these combined questions. They are tube mills and centrifugal mills.

The pulverization of the tube mills is due to the crushing action of flint pebbles or steel balls (¾ in. to 1½ in. diameter) which are caused to rise by the centrifugal force of the rotation of a lined steel cylinder. By choosing the speed judiciously the centrifugal force will not overcome the weight completely so that the mass of pebbles and material lifted to a certain height will drop on the part remaining on the bottom of the drum, thus pounding, grinding and polishing every particle to dust. Fed in at one end of the drum, the material travels through the tube, generally 15 to 25 ft. long, by the law of deplacement and drops out at the other end. The degree of fineness is guaranteed by an end plate, slotted in a way that retains the coarser material, and by regulating the feed, because the longer the material stays in the tube the finer it will be ground. The factor that influences most the efficiency of the machine seems to be the weight of the charge of balls, which explains the pressing of the flint pebbles (density less than 3) and the general adoption of steel on chilled balls (density about 7.5).

In late years the closely related ball mills have been combined with the tube mills into one unit, with distinctive patented features. These combinations save the double handling of the material with the intermediate elevators, bins and feeders, and receive material from 2 in. to 3 in. down at one end and deliver at the other end the finished product ground to the required degree of fineness. These combination mills have found a ready market and are very efficient and practically control, both in Europe and in America, the artificial Portland cement field with its extensive grinding and pulverizing of raw material, coal and clinkers. The simplicity of construction, their low running speed, their small repair bills and the possibility of building large units are the appreciated advantages, which outweigh the somewhat high power bill per ton pulverized and assure low ultimate cost of grinding.

Centrifugal Mills

The centrifugal mills imitate the burring action of the chemist. A rotating steel mass is pressed against a hard steel ring and by constantly throwing material between these parts the crushing action is obtained. The pressure is generated by the centrifugal force of a shaft rotating at high speed driving the rolls or balls. These mills are not suited for hard, gritty material because they do not resist the abrasive action of highly silicated rocks, but they give very efficient service for the pulverization of softer materials like soft limestones, phosphate rocks, coal, coke, etc. They are the favorite fine grinder in the powder coal plants to-day and reduce any solid fuel from about 1 in. lumps down to an impalpable dust. Their productivity is nevertheless considerably increased by the previous reduction to ½ in. and ¾ in. size, or less.

The above principle has been developed by the manufacturers along different lines with varied success. Some designers preferred a stationary horizontal ball-ring with swinging horizontal rolls; others loose steel balls, while other makers thought a vertical ballring with vertical rollers would give better results; others even made the ring turn, too. The prototype of these mills, as far as the author could trace priority, are the well known, now discarded, "Huntington Wet Pans" described in all mining treatises.

The pulverizing action depends entirely on the rotation and pressure of the rolls, roller or balls against the grinding ring and the effectiveness of the device assuring a constant uniform stream of material between these crushing masses. That production increases with the number of grinding balls or rolls seems evident, but practical consideration and simplicity of construction limit their multiplicity. To assure easy balance an even number of balls or rolls seems logical on account of the natural reactions in diametrically

opposite directions. The velocity influences the output both in quality and quantity, but an increase of speed beyond certain limits is not warranted for mechanical reasons and safe operations.

The diameter of the ball ring is of great importance and should not fall below a certain dimension so as to avoid any appreciable wear and tear, not only because its replacement is a rather tedious erecting operation in the field, but because it seems that an increase of the original diameter due to wear reduces the efficiency of the crushing action. This explains why the smaller machines do not realize the same results as the larger types, a fact openly acknowledged by a leading manufacturer.

As the centrifugal force depends on the weight of the rotating masses and the radius of rotation, the pressure exerted can only be partly regulated by some machines. This pressure ought to be determined with care, since the harder mineral impurities have to be crushed as well. Only thorough theoretical calculations and careful practical tests can decide upon the exact relation between these different variables. Standardization has been in this problem a great handicap to progress, because the same machines are not only unchanged for years, but are recommended without change for material of different hardness. The importance of the feeding devices has been entirely overlooked. The centrifugal mills are usually provided with one feeder, of the screw, roll or plunger type, and all attention has been concentrated on this visible device regulating the continuous flow of material to the machine, but these apparatus do not feed the rolls, they do not guarantee that each roll or ball receives its continuous stream of material. Some types of mills provide for this by special plows, or ingeniously curved blades throwing always enough coal between the rolls and the ring where the real grinding is done.

The rolls or balls themselves ought not to plow through the material accumulated at the bottom of the machine, because their function is to grind in the one direction determined by the action of the centrifugal force. Constant rotation through the layer of material not only causes inefficient working conditions, but also creates additional wasteful friction; greater wear and a higher power consumption. In fact, ample room should be provided between the floor from which the material is picked up by the plows and the ring die to insure a free motion of the crushing masses without dragging in the mass. This consideration explains why vertical ring machines deliver much less fine powder, have a smaller output and necessitate the installation of bigger motors in spite of the simplicity of their construction, their higher speeds of rotation and their apparent direct action.

Screening and Sifting

The absolute necessity of delivering an impalpable powder characterized by a definite degree of fineness requires an automatic sifting device with every mill. While for separation of coarse materials only mechanical grading methods are available, for very fine powders mechanical and pneumatic principles are used for separating purposes. Mechanical sifters consist essentially of perforated or slotted plates, woven wire screens or special bolting cloth. The ground powder is thrown on or against these sieves, what passes through the openings is fine enough, while the refused coarser particles are retained and returned for a second grinding.

In centrifugal mills the screen is usually mounted above the ball ring in two circles. The powder produced is lifted by the action of rudimentary blades forming and whirling the dust-laden air against the sieves. The refuse drops back into the mill and the finer powder passing the slots or mesh openings is evacuated to the bins.

Mechanical screening is by no means perfect. It depends entirely on the effectiveness of the sieves, difficult to inspect and troublesome to replace. The main objection is the unreliability, because the abrasive action widens the mesh openings and a weak spot in the sieve causes an abnormal local wear and spoils the whole effect. On the other hand mechanical separating is very cheap, requires very little power and gives satisfactory results for powder not too hard and not too fine.

Pneumatic sifters are more perfect in their operation, more reliable and constant in the fineness of their grading, more effective within a large range of fineness, and especially adapted for the finest impalpable powders, but they necessitate in their present market form the costly installation of a special fan with motor and consume a great amount of current for their operation.

The actual tendency toward greater fineness of powdered solid fuel has increased the popularity of the pneumatic separators. The users seem to prefer to pay in kilowatts for the reliability of operation and for the absence of bother with cloth and screen. Incidental advantages of importance are absolute dustproof installations and delivery of the coal powder at any convenient height and distance from the mill; pneumatic sifters furthermore increase the output of the pulverizers by immediately removing the fine powder and by keeping the mills cleaner and cooler by constant air circulation.

In its actual form air separators consist of a grading device just above the mill, separating the coarse from the fine, a motor-driven fan, a cyclone separating impalpable powder from the air and connecting air lines with return lines. The principle involved is the floatation of dust in air currents; important factors are the volume, velocity and pressure, positive or negative, of the air stream in the various phases of the circuit.

To improve the efficiency of air separators seems to be a very promising field for inventors, because their power consumption is entirely out of proportion to the real useful work they perform. For instance, a centrifugal mill, pulverizing 5 tons of coal per hour, requires a 25-hp. motor to drive the fan. Through theoretical investigations and detailed analyses of the whole system the author has been convinced that great economies are possible with slight changes, because on some machines the flow of air is contrary to all laws of physics in spite of well patented features and clever talking points. A reduction of the operating cost of air separators will not only extend the market of powdered solid fuels through cheapening the cost of production, but will also prove beneficial to a score of other industries where fine pulverization is essential.

Drying and Dehydrating

The moisture content of solid fuels varies considerably with the nature of its carbon and the age of its formation. As the problem of drying is closely related to the amount of water that has to be evaporated, the methods of dehydrating vary from coals and anthracites to lignites and peats.

According to the "Mechanical Engineers Handbook" over 75 per cent of all kinds of American coals and anthracites record less than 10 per cent moisture, so that the statement that most of the coals or anthracites coming fresh from the mines contain from 2 to 8 per cent water can be accepted as a fair average.

If exposed to rain or washed for cleaning purposes or grading, slightly over 10 per cent water will be absorbed, of which 4 to 5 per cent will again disappear through dripping or evaporation when exposed to the air. Lignites, and especially peat, have very different characteristics; their carbon is much less dense, their

origin more recent, their mineralization much less advanced and their texture more vegetal. Lignites or brown coals record from 20 to 25 per cent of moisture fresh from the mine, and after a lengthy exposure to the air they show around 12 per cent, while fresh samples of peat direct from the ditches contain over 75 per cent of water, which is reduced to 15 or 20 per cent and even less according to the age of the formation and locality.

Mechanical reasons pertaining to the economies of pulverization explain the necessity of dehydrating the fuels to be ground. It must be conceded that this prescription is not absolute and that tests may be made successfully with powder that is not dry. But to assure a continuous service without shutdown periods or annoying disturbances it is very prudent to accept the value of the prescription that less than 1 per cent of water ought to be found in the fuel powder.

Because the coals and anthracites do not stick to steel plates, they are usually dried in drum dryers, composed of slightly-inclined, rotating steel cylinders. According to the fancies of the manufacturers they are built with one drum, or two drums, one inside of the other. A grate usually permits the production of the hot air that evaporates the moisture, and a motor-driven fan or stack guarantees the evacuation of the waste gases. Of importance are the inclination of the drum and its velocity of rotation, the exposed surface (diameter and length of shells) and the time of exposure given by the feeding device. All these factors have to be valued carefully as to their relative influences.

The great advantage of the drum dryers consists in their automatic way of handling and transporting the material to be dried. The combination of the inclination and rotation assures an easily controllable advance of the material. Drum dryers practically control the powdered coal market in their more or less perfected forms.

Dehydration is a specifically low temperature operation. The fuel needs only to be treated slightly over 212 deg. Fahrenheit, where evaporation takes place at atmospheric pressure, and care should be taken so that under no conditions the temperature raises above 350 deg. or 400 deg. Fahr. This for two reasons: first, because it is absolutely unnecessary and wasteful as no increase in efficiency is obtainable by higher temperatures; second, because it is dangerous, as some coals, containing volatile hydrocarbons, may become distilled, causing ignition of the fuel and destroying, or at least injuring, the whole installation.

Waste gases from high temperature producers, like boilers or reheating furnaces, are often by-passed and utilized with great advantage in dehydrating, dispensing with the cost of fuel required for that operation.

Accessory Operations

Coal transportation is usually accomplished in bottom-door cars of great capacity easily unloaded into track hoppers of the usual kinds; the unloading tracks are either on floor level or elevated on a trestle, according to the peculiarities of the local conditions.

Sufficient storage room ought to be foreseen for the coal, preferably in the raw form, uncrushed and undried, to prevent shutdown. If possible, a week's supply ought to be on hand outside of the pulverizing plant proper at easy reach, while in the plant a minimum of two days supply ought to be stored in all hoppers, bunkers and bins.

Lump coal is elevated very economically by bucket elevator of the chain or belt types. The hoisting equipment ought to be totally enclosed in sheet iron frames to prevent accidents and to reduce the formation of dust. Belt conveyors or screw conveyors are admirably suited for horizontal transportation of coal. The belts can even be inclined, if local conditions require it, up to 15 deg. Screw conveyors ought to be covered and airtight to avoid production of dust.

To insure the machinery from breakage and to recover tramp iron that may be accidentally mixed up with the coal it is very recommendable to install magnetic separators. Most popular is the magnetic head pulley type of standard construction. To guarantee good action the coal layer passing over the pulley ought to be spread out nicely, not over 2 in. to 3 in. thick, in order to give the magnetic field a chance to act properly.

Control instruments in forms of automatic scales, if possible of the recording type, ought to be installed, to permit an easy check of the running of the plant and the amounts of coal handled. All foundations in the pulverizing room ought to be above floor to avoid any accumulation of coal dust and to prevent accidents. This precaution ought never be neglected. Proper ventilation of the building is a matter of course, but all the various apparatus ought to be ventilated, too, especially the dry coal elevator, as well as the dry coal bins, to avoid the "sweating" of the coal.

Sequence of Operation and Choice of Machines

The drying of coals and anthracites usually follows the preliminary crushing to proper size, this for the good reason of reducing the formation of dust to a minimum. Furthermore, as most of the water in the coals is not chemically combined with the carbon, no better results are possible by dehydrating coals in a more finely crushed form.

If ball and tube mills are used for first pulverization it is most recommendable to stop the preliminary crushing at 1½ in. to 2 in. lump size, but if centrifugal machines are used preliminary crushing ought to deliver ¾ in. to 1 in. lumps and less, because the biting angle between rollers or balls and ring die limits the upper size. It seems even that, in case of large installations grinding 300 to 400 tons daily, it would be profitable to crush first down to 2 in. in roll crushers, to dry, to disintegrate in a hammer mill with large screen down to ¼ in. and less and to pulverize in centrifugal mills. This would divide the grinding into three steps. The installation of the hammer crusher would considerably increase the capacity of the pulverizers and reduce the number of their units. A noticeable drop in the power consumption per ton of coal ground seems to be assured by any large installation developed along these lines.

On the total cost of pulverization hinges the economy of this method of burning solid fuels. The efficiencies obtained through more perfect combustion and better control have to outweigh the operating cost of the pulverizing plant, including overhead charges, to guaranty permanent success. Published data on this subject are very incomplete and lots of information is obsolete and misleading on account of the ever-changing economic condition of the present period.

It is generally conceded that the cost of pulverization per net ton of coal varies from 25 to 60 cents. This is far from precise and leaves a liberal margin for local variation. The factor that influences most the cost of operation is the size of the pulverizing plant. A large daily capacity reduces considerably all incidental charges and permits the full development of up-to-date handling methods and takes full advantage of concentration. Small plants have often to compromise on the choice of machines, a condition that reduces efficiency. The recognition of this fact brings very near the suggestion of creating large plants through co-operation between local users to combine their individual plants into large installations for mutual profit.

Fittings and Flanges of Cast Steel

Casting These in Green Sand and a New Shop to Machine Them Features of New Department of Reading Steel Casting Co.

BY EDWIN F. CONE

TO meet the demand to secure steel castings completely machined, the Reading Steel Casting Co., Reading, Pa., has erected a shop at a cost of $250,000. While equipped to machine the various castings produced, the shop is also equipped for finishing its product in the special line which it has lately entered. This new field is that of fittings and flanges of cast steel.

The new building was erected during the past year and is of fireproof construction with steel frame work, gypsum roof and concrete plastered sides. It is lighted with continuous steel sash. The length is 200 ft. and width 110 ft. with a 15-ton runway in the center, 50 ft. wide, with two parallel bays 30 ft. wide. Provision is made on both sides for a gallery for small tools. On one gallery is located modern wash rooms, lavatories and lockers as well as a small separate machine or repair shop for the general foundry. Only such tools as could handle steel castings at very high speed were selected, in addition to some special machinery not heretofore on the market for finishing steel flanges and fittings. The equipment includes four Bullard vertical boring mills, one 100-in. Niles-Bement-Pond boring mill; seven lathes; six radial drill presses, etc. There is, of course, tool room equipment for the manufacture of tools and jigs.

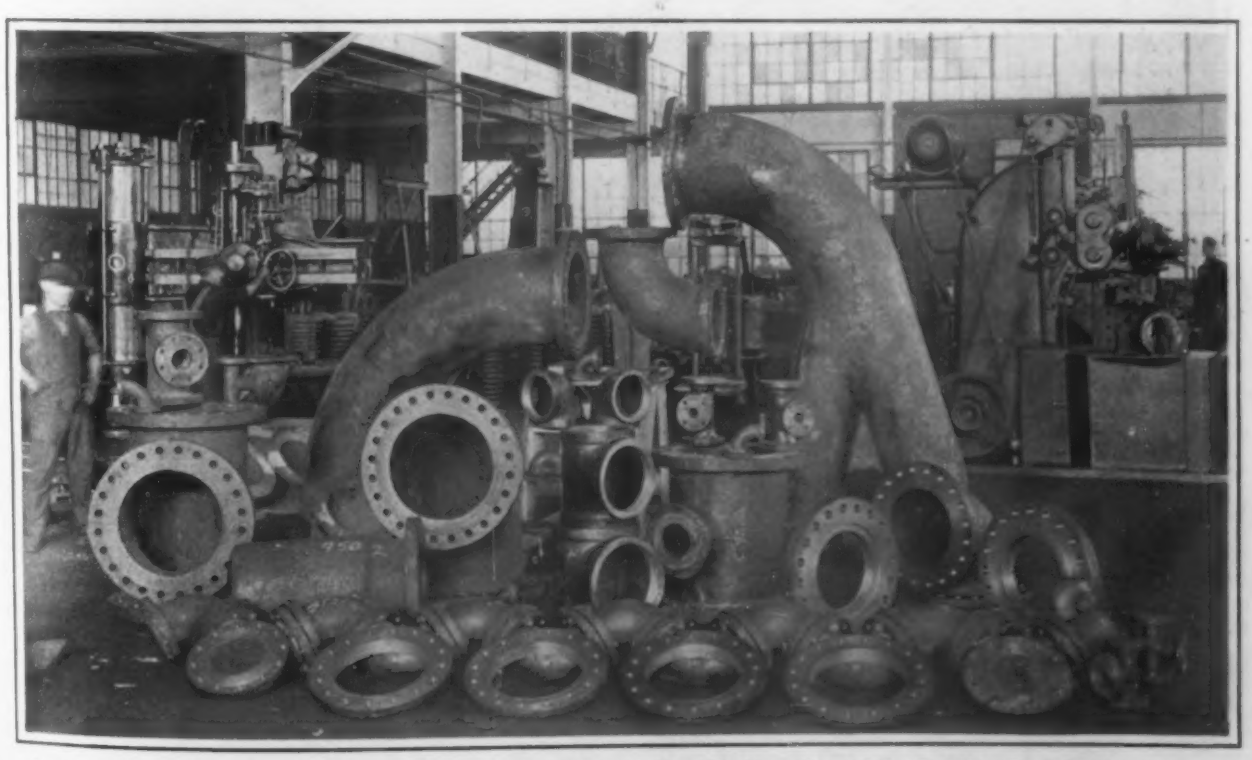
Besides the output of the standard ells, tees and crosses, the company has produced and is prepared to make all of the large special fittings such as elbows, tees, crosses with side outlets, ells with side outlets, Y's, laterals, etc. The illustrations show some of these shapes already produced.

Probably the most interesting feature in connection with this special work is the molding practice employed. A method has been perfected which permits the casting of fittings and flanges in molds which have not been baked or dried in any way, the castings machining without blow-holes and standing without leakage from 500 to 2500 lb. hydrostatic pressure to the square inch.

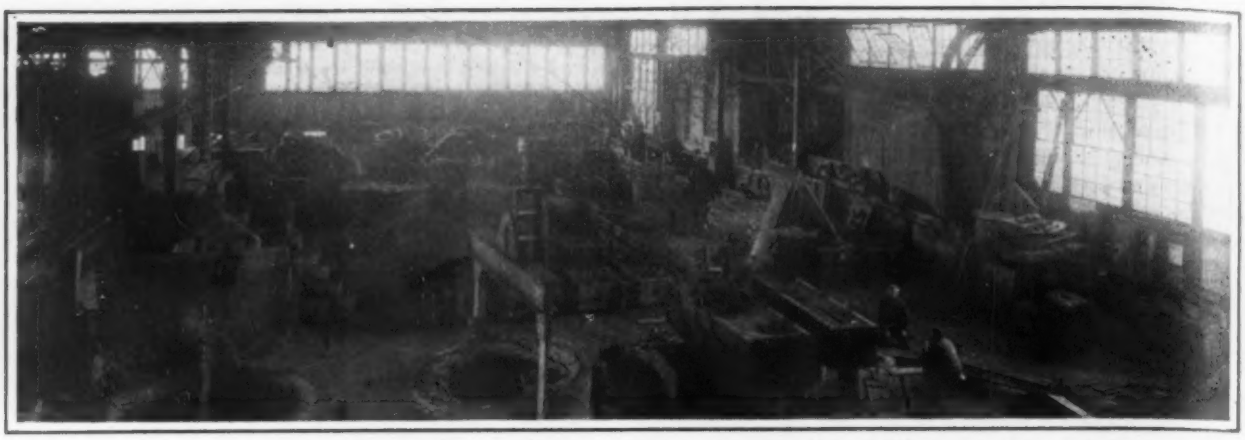
Heretofore it has been the practice in steel foundries to make castings of this kind only in dry sand molds. It was also found that solid castings could be obtained only by the use of extreme care. In fact, the difficulties surrounding the production of material of this kind were so great that the majority of the foundries were disinclined to accept such orders. It is therefore a surprise to most foundrymen that such work can be made successfully in molds which have not been baked.

Broadly speaking, the secret of the success is two fold. First, the sand mixture which is special in every way and largely a secret. Second, unusual means as well as great care in venting the molds and cores. The sand mixture used impresses the newcomer into the foundry as akin to a gray iron sand mixture because it is almost black in color, but its binding and other qualities are exceptional.

Another feature is that with the exception of a few very special shapes, all castings are produced on molding machines. This results not only in a saving of labor but also in pattern equipment, it being possible to mold from two half patterns on a match board two pipes, whereas by the other process of hand molding only one pipe is possible from one whole pattern and in much less time. One of the features of the foundry practice is the success achieved in eliminating the necessity for labor.



Some of the Cast Steel Fittings and Flanges Machined in the New Machine Shop of the Reading Steel Casting Co.



The Department of the Foundry Where Large Castings Are Made in Green Sand and Poured Directly from the Open-Hearth Furnaces at the Left. The Reading company claims that by this method certain heavy castings have been produced in a few hours as compared with as many days in dry sand

The handling of much of the material by common labor has been replaced by the use of tumbling barrels, grab buckets and lifting magnets.

Not so long ago in this foundry and in many plants to-day all castings, after they are removed from the sand, are cleaned by pneumatic hammers or hand hammer cleaning. The present practice at the Reading foundry is to place nearly all castings directly into tumblers where sand, nails and excess material are quickly removed and from which the castings emerge unusually clean and polished.

The company has nine such tumblers, two of which are also supplied with a sand blast which operates at the same time the castings are being tumbled. One of the largest of such machines ever constructed is shown in one of the illustrations. It was made by the company itself. The outside dimensions are 7 ft. long by 3 ft. 6 in. in diameter, the cast steel plate forming the shell being about 1½ in. thick. It is calculated that unusually large castings can be tumbled in this and cleaned much quicker than by the usual process.

Another factor in eliminating labor has been the introduction on a considerable scale of molding machines. The company now has in operation over 40 such machines. By their use it has also been found possible to make some unusually large or at least long castings which some years ago were not attempted except by hand molding. The use of snap molds, especially applied to even sizeable castings, has been widely extended until this practice is a special phase of this foundry's output.

One of the illustrations shows a department of the plant where green sand molding is being successfully applied to large general jobbing castings. The same sand mixtures are being used here that have been described in connection with the pipes and fittings. Here struts for ships are being made, part of the pattern being embedded in the foundry floor.

In the IRON AGE of Sept. 23, 1915, the plant of the Reading Steel Casting Co. was fully described as it then existed. At that time it was rated as the largest converter steel foundry in the country,

In the Left Foreground Is What Is Believed to Be the Largest Tumbler for Castings in Use. Cleaning casting by tumbling is a feature at this plant, nine being in use.

specializing of course on small castings. With the use of four converters and two cupolas the output was 600 tons of finished castings per month, averaging 30 lb. each.

Since then some radical changes have been made, besides the ones already described. About two years ago the company supplemented its melting equipment by installing a 10-ton acid open-hearth furnace. A few months before the armistice was signed, another open-hearth furnace of 20-ton capacity was built for producing shell ingots of cast steel. This was located in a new extension to the main foundry building at the extreme western end of the main building.

With the resumption of more normal times the new 20-ton furnace has been turned on to regular orders for the larger sized castings as well as assisting in the pouring of small castings also. The former 10-ton open-hearth furnace has been dismantled and is now being rebuilt as a 20-ton furnace adjacent to the new 20-ton furnace.

The company therefore is a producer of both converter and acid open-hearth castings. As indicative of the expansion of the company's business in four years it may be stated that the present output or capacity is close to 2000 tons per month of finished converter and open-hearth castings, small sizes predominating.

Arrangements are such that it is possible to pour either open-hearth or converter metal into either dry or green sand molds. Most of the converter metal however is now applied to the green sand and snap mold smaller castings.

The combination in the same foundry of both the converter and open-hearth metal, as operated at Reading, makes possible as large an output as some foundries are to-day securing from three 25-ton open-hearth foundries. An important factor in this larger comparative output is the use of labor saving equipment such as molding machines, rumblers, etc., as well as the extended adoption of green sand molding.

Welding Steam Manifolds

Steps in the manufacture of high-pressure steam manifolds in the shops of a Pennsylvania engineering company by the Airco process are shown in the accompanying illustrations. This construction is explained as providing not only an easy method of manufacture, but as resulting in a construction of great strength and pressure withstanding qualities.

In welding one of these branches a piece of 4-in. steel pipe 18 in. long is used. The centers for the

sleeves are chalked off and holes cut by a cutting torch. Then the first socket is lined up and welded, others following until the job is completed. Nipples are placed in the sockets in order to protect the threads during welding.

Following the welding of the sockets, disks of the proper thickness are cut and welded in each end of the manifold. These disks are chamfered, so that when placed in position in the manifold the necessary bevel or V for a strong weld is secured.

To weld a manifold complete takes about two hours and requires approximately 80 cu. ft. of oxygen and 70 cu. ft. of acetylene. The apparatus and gases were supplied by the Air Reduction Sales Co., 120 Broadway, New York.

Coffee an Offset to Production Fatigue

A coffee kitchen, from which the beverage is served at noontime without charge to all its employees, has proved a valuable aid to efficient manufacturing at the plant of the W. S. Tyler Co., Superior Avenue and Thirty-sixth Street, Cleveland. One of its principal products is wire cloth and screening for straining paper pulp, etc., and this refreshment at a time when the mental and physical faculties of the workers begin to decline has been found by the management to stimulate the digestive organs enough to keep a man fit throughout the day.

The kitchen began operations on Dec. 2, 1918. Three 35-gal. percolators were installed. The initial cost was about $200. The dealer who supplied the coffee took charge of operations and sent an expert who instructed the woman, who now attends to the work, in the intricacies of proper coffee making.

Each department foreman has his pots or carriers which hold enough to supply all men in his department. Each morning the foreman ascertains how many of his men want coffee. This memorandum he sends to the woman who has charge of the kitchen, and comes on the job at 9 a. m. About 15 min. before the noon whistles blow, foremen send to the coffee kitchen, which is a little glassed-off corner in one of the workshops, for their supply. The pots and pails, each bearing a metal tag with the foreman's name or department, are ready for distribution. Each man who wishes to take advantage of the coffee service is required to buy his own cup, pint-size, white enamelware, at 25 cents. When the service is discontinued or the man quits the employ his 25 cents is refunded.

About 500 employees take advantage of this service. Each man gets nearly a pint or the equivalent of two large breakfast cups. The total cost figures about $20 a day, that is four cents per man or two cents per cup. This high average is due to two causes: The company buys the very best coffee it can get and serves it with a liberal allowance of pure cream. The daily use of cream amounts to six gal. This is included in the total daily expense of $20, as are also the wages of the woman who makes and serves the coffee—$2 a day. The company uses on the average 22 lb. of coffee a day.

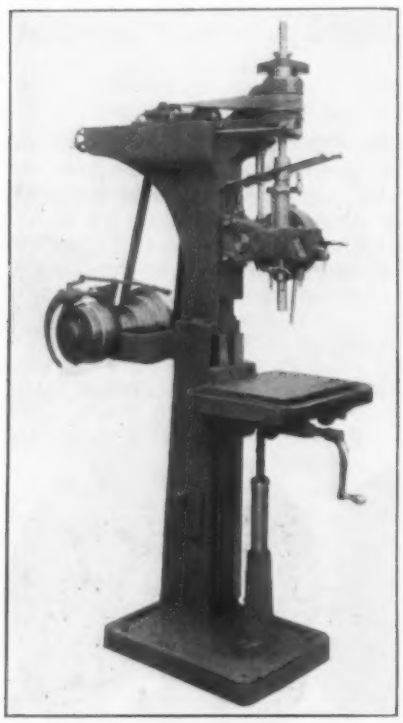
Emphasis is placed by E. P. Disbro, assistant treasurer of the company, on the importance of maintaining high quality of beverage. In his opinion "it is just as foolish to supply men with poor coffee as it would be to buy a poor grade of oil for a very delicate machine, and any manufacturer will agree that that is a poor saving."

The Nukol Fuel Co., 88 Bay Street, Toronto, Ont., plans to erect briquetting plant in Port Arthur or Fort William, Ont., at a cost of $100,000.

New Avey Automatic Drilling Machine

An Avey drilling machine which can be used as an automatic, semi-automatic, or plain hand feed drill is being manufactured by the Cincinnati Pulley Machinery Co., Cincinnati. Conversion from one style of operation to the other is quickly made by the movement of one member.

When used automatically both approach and return of spindle are automatic; the spindle going through a continuous number of cycles of operation without the necessity of engaging or disengaging the feed by the operator. In the semi-automatic feeding, the spindle completes one cycle, consisting of engaging the feed by a clutch lever by hand, feeding down to depth as determined by the graduated depth stop, tripping automatically, returning to the starting position and stopping. The change from full to semi-automatic feeding is obtained by giving the adjustable pin a quarter turn so that in this way the power feed is engaged or not when the spindle returns.



Quick Conversion from Automatic to Semi-Automatic or Plain Hand Feed Operation Is Emphasized as a Feature of This Avey Drilling Machine

The hand feed lever, used only when the power feed is disengaged, has a ratchet arrangement whereby it can be set in any position in relation to the spindle or can be disengaged without revolving when automatic feeding is utilized. The spindle can be advanced by hand ahead of the power feed without disengaging the latter and without loss of time, as the clutches pick up the power feed automatically where the hand feed drops it. This is accomplished by means of an extension weight bar directly in front of the operator. The design and operation of the clutch are explained as making it possible to drill blind holes within 0.002 in.

The strokes can be varied in length from a maximum of 5 in. to a minimum of ⅜ in. The greatest number of strokes per minute is 30, and 4 feeds and 4 spindle feeds are available. The capacity for drilling is ¾ in. in cast iron and ⅝ in. in steel, with maximum spindle speed of 3500 r.p.m. All revolving members in the head, as well as the idlers, spindle and countershaft, are mounted on annular ball bearings. Several attachments can be added to the machine, including an automatic cut-off valve for the lubricant whereby the latter flows only while the drill is cutting, and a stroke-limiting device which automatically controls the number of strokes the spindle will make before stopping.

Opposed to the Metric System

The committee on trade and commerce of the Chamber of Commerce of Pittsburgh has given careful attention to the question of the adoption of the metric system of weights and measures, and has reported in opposition to it, saying in part:

The metric system was legalized in 1866 by virtue of an act of Congress. Thus, for over 50 years it has stood on a legal parity with the English system and fully available to all who wished to use it. Is it not, therefore, fair to say that if it cannot win on its own merits by voluntary adoption under the protection of this law it is not entitled to win under a law of force? The present attempt is to prohibit the use of the existing system and make the metric standard the one exclusive official system.

At this time, when as a result of the world war, production and commerce are in a chaotic condition and when the whole world is hungry for the products of the two greatest nations whose commerce would bear the whole burden of this inopportune tampering with the fundamentals, it would be folly to make "confusion worse confounded" by attempting any such radical change.

It is and always has been the practice of Pittsburgh manufacturers to quote upon inquiries as well as to execute orders based on the metric system. This is readily done by converting into our own equivalents.

Three-fourths of the world's manufactured goods and more than a large majority of the machine tools used in Latin America are produced on the system of measurements which we use to-day.

As soon as it became known that the chamber was to consider this subject, your committee began to receive in rapid succession communications from prominent manufacturers and representative organizations, all but two of which vigorously condemned the effort to further disrupt our industrial and commercial conditions by inopportune tampering with such a vital basis of production.

Only two firms appeared to favor the meter-liter-gram system and one of these qualifies its opinion by stating "unless the changing over would have an effect that we do not know of."

Turntable Tractor

A tractor made for turntables of any pit rail radius is announced by the Whiting Foundry Equipment Co., Harvey, Ill. The main frame is V shaped, consisting of I-beams and channels rigidly connected and attached to the turntable by steel hinges, so as to prevent vertical movement of the tractor when the engine is run on and off the table. The frame is extended outside the traction wheel so that counterweight may be supplied to obtain additional tractive effort required for heavy conditions. Traction is obtained entirely by gravity and not by springs. The gearing can be readily removed without disturbing adjacent parts.

The sanding device consists of a steel sandbox with a vertical swinging valve connected with a sand agitator. Valve and agitator are operated from within the cab. The sandbox is located directly underneath the cab floor and is filled or cleaned from within.

The brake is an asbestos-lined band type of the same design as supplied on the company's electric traveling cranes. It is explained as powerful enough to stop the table suddenly or to give the operator a delicate control for registering rails.

Traction in This Turntable Tractor Is Obtained Entirely by Gravity

The tractor is propelled by a motor located on top of the structural frame, high enough so as not to be affected by water in a poorly drained pit. It is a variable-speed, reversible, heavy type motor of standard design. The controller is a standard, reversible drum type. The tractor is wired complete and ready for connection to power leads.

Phosphorus and Sulphur in Steel

Plans for the Comprehensive Investigation by a Joint Committee of Three Organizations

A REPRESENTATIVE committee has been appointed at the initiative of the American Society for Testing Materials, the Railroad Administration and the United States Bureau of Standards, for the investigation of the effect of phosphorus and sulphur in steel. This important metallurgical problem has received heretofore considerable attention in individual research laboratories but the present movement represents the first concerted effort of interested organizations to make a thorough study of it, and to combine their resources in a way to give impetus to a research problem of considerable magnitude.

The need for a research on this subject has been felt for some time, but it required the stringency of war conditions to bring the question sharply home to the manufacturers and users of steel. It will be recalled that the American Society for Testing Materials recognized at its annual meeting in 1918 the abnormal difficulty in obtaining an adequate supply of steel in time of war, and particularly in meeting the phosphorus and sulphur limits as specified in the A. S. T. M. specifications, owing to the high sulphur coal and low phosphorus pig iron and scrap which had to be used to meet war time demands. The society accordingly raised the limits for sulphur in all steels and for phosphorus in acid steels 0.01 per cent above the requirements in 43 of its specifications for steel, to be effective during the period of the war and until otherwise ordered by the society. The Armistice was signed in November, 1918, and in the next six months conditions had so improved that the society restored the original limits for phosphorus and sulphur in 29 of these specifications, covering what might be called the special steels such as spring steels, forging steels, and tire and wheel steels. Action on the removal of the note from the remaining 14 specifications, covering in general the tonnage materials such as plates for buildings and ships, was deferred until 1920.

The committee on steel of the society, however, realized that it was essential to secure reliable information concerning the effect of phosphorus and sulphur in steel in order to make suitable recommendations to the society concerning the limits of these elements in the A. S. T. M. specifications. On consultation with the United States Railroad Administration, representing probably the largest single user of steel, and the Bureau of Standards, it developed that the latter would be entirely willing to co-operate actively in conducting an investigation.

Accordingly the committee on steel recommended to the executive committee of the society that a thoroughly representative joint committee be formed, consisting of representatives from those organizations and industries having a particular interest in the subject. A hearty desire to co-operate was evidenced by all interests approached, and the joint committee was formally organized on Nov. 29, 1919.

The Joint Committee

The personnel of the committee is now as follows: Representing the Bureau of Standards: George K. Burgess and H. L. Whittemore, Washington; the United States Railroad Administration, F. M. Waring, Pennsylvania Railroad, Altoona, Pa., and H. E. Smith, Box 491, Eleventh Street Station, Washington; the American Society for Testing Materials, Robert W. Hunt & Co., 90 West Street, New York, and T. D. Lynch, Westinghouse Electric & Mfg. Co., East Pittsburgh; the Society of Automotive Engineers, F. P. Gilligan, Henry Souther Engineering Co., Hartford, Conn.; the Association American Steel Manufacturers, E. F. Kenney, Midvale Steel & Ordnance Co., Philadelphia, and J. J. Shuman, Jones & Laughlin Steel Co., Pittsburgh; the Steel Founders Society, J. E. McCauley, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.; the War Department, F. C. Langenberg, Watertown Arsenal, Watertown, Mass.; the Navy Department, D. J. McAdam, Naval Engineering Experiment Station, Annapolis, Md.; the U. S. Shipping Board, Frank Gentles, 140 North Broad Street, Philadelphia, and the National Research Council, John H. Hall, Taylor-Wharton Iron & Steel Co., Highbridge, N. J.

The chairman of the committee is Dr. George K. Burgess, Bureau of Standards, and the secretary, C. L. Warwick, secretary-treasurer American Society for Testing Materials, Philadelphia.

Program of Tests

The following program of tests has been adopted by the joint committee to serve as a basis for the investigation:

MATERIAL TO BE CONSIDERED

1. The tests are divided into two series, designated A and B. In each series it is necessary to keep all factors as constant as possible, varying only the percentages of phosphorus and sulphur.

Series A Tests

Sulphur in all steels to be "Residual Sulphur."

Group	Material	Carbon	Manganese	Phosphorus*	Sulphur*
1	Rivet steel, tubes, etc.	6–12	35–40	2–3	3–4
				4–5	5–6
				6–7	7–8
2	Plates and structural shapes, including boiler plate.....	16–22	35–40	3–4	3–4
				5–6	5–6
				7–8	7–8
3	Forgings, such as car axles, treated and untreated	45–55	50–60	3–4	3–4
				5–6	5–6
				7–8	7–8
4	Wheel, tire and rail steel	65–75	60–70	3–4	3–4
				5–6	5–6
				7–8	7–8
5	Spring steels.....	95–105	35–45	2–3	3–4
				4–5	5–6
				6–7	7–8
6	Castings.	Compositions to be considered later.			

All compositions are expressed in hundredths of percents.

*With each of the specified ranges of phosphorus it is understood that the sulphur content is to be constant and equal to the usual value for that group of material. (Vice versa for sulphur.)

Series B Tests

In these tests higher percentages of phosphorus and sulphur than are specified in Series A tests shall be used. The purpose of this series is to carry the tests beyond the percentages of impurities specified in Series A, to a point where the material will unquestionably fail from the effect of the higher impurities.

In this series sulphur may be added during the later stages of manufacture, before reaching the mold, the form of the addition to be determined by the committee in charge of the tests. Any heats originally prepared for Series A tests which run too high in phosphorus or sulphur may be diverted to Series B.

2. The tests in Series A cover practically all of the usual ranges of carbon, and of the materials covered in the specifications for which Committee A-1 is responsible. The ranges in phosphorus and sulphur extend up to 0.09 per cent, which is considered to be practicable for present commercial practice. It is considered desirable to investigate first the materials in this series; but the desirability of studying the problem from a more general point of view is recognized by providing for the tests in Series B covering higher limits of these impurities. The chemical compositions in these tests, other than phosphorus and sulphur, should be typical of the various grades specified.

3. Particular attention is directed to the requirement that the sulphur in the steels of Series A shall be "residual sulphur," that is, sulphur present in the steel through fuel or from pig or scrap. The committee believes that the results of this investigation will be more conclusive and carry more

weight if the high sulphur steels in this series are not obtained by the addition of sulphur in the ladle or molds. The opinion is held by many that high sulphur is frequently not harmful *per se*, but is indicative of other undesirable conditions in the steel, inherent in the various stages of manufacture; and that these undesirable conditions do not necessarily accompany high sulphur when the latter is obtained by addition in the ladle or mold. It is for this reason that the committee has recommended that the sulphur in the steels of Series A shall be "residual sulphur."

In the steels of Series B it is realized that very high sulphur content could probably not be obtained without such addition. The provision that such addition shall be made before reaching the mold is made because a great number of tests on high sulphur steel where sulphur was added in the mold have been made by Doctor Unger, and the idea of the committee is to endeavor to tie in its investigation with that of Doctor Unger in this respect.

4. All of the material in these tests shall be of as uniform quality as possible. Accordingly, segregated top cuts shall not be used in the tests.

5. In these tests regular heats are desired, that is, no special small heats such as one-half ton, etc. A history of each heat shall be obtained and any heat shall be discarded which gives evidence of irregular conditions.

6. In all of the tests, billets shall be rolled down from ingots without allowing the ingots to go cold. The billets of any one group shall be assembled at one plant, and shall be put through the regular manufacturing practice into the shapes to be used, at the same time and under the same conditions.

7. The actual detailed program of tests should be so arranged that it will be possible to concentrate in the beginning on the more urgent problems. Thus the committee suggests that the first heats which should be secured in this program are those of Group 1 on rivet steel, tubes, etc., and Group 2 on plates and structural shapes, etc., considering the sulphur as the variable and the phosphorus as constant. In the meantime the work of securing data concerning phosphorus and sulphur in all other groups, including service results, should be vigorously carried on. The order of carrying out the program of tests beyond that outlined, and all other details of the investigation, shall be left to the committee in charge of the tests.

Nature of Tests to Be Made

8. The first essential is to secure all possible existing data and service results, including such as can be obtained from abroad. In this work the sub-committees of Committee A-1 can, it is believed, be of very considerable assistance.

9. Laboratory, fabricating and service tests are essential to the study of the effect of phosphorus and sulphur on steel. Laboratory tests unsupported by fabricating or service tests would not, it is believed, be conclusive. In some groups of material, such as structural steels, service tests in the usual sense of that term are difficult; but in those cases laboratory and certain fabricating tests would give, it is believed, all necessary information.

(a) Under laboratory tests should be included, in addition to the necessary chemical analyses, such tests as tension tests, impact and alternating stress tests and metallographic tests, as well as the determinaion of oxides and gas content. Standard methods of chemical analyses should be followed throughout.

(b) Under fabricating tests are included such operations as flanging, punching, drifting, cold pressing, riveting, etc.

(c) Service tests should be divided into two classes: Tests on material in service which has given entire satisfaction, including material discarded because it has worn out in service, and tests on material which has failed through inherent defects. In each instance a history of the sample should be obtained.

In connection with service tests emphasis should be laid upon the desirability, wherever possible, of making tests of full-size parts.

Work Done by the Committee

Although the committee has been formally in existence only for some two months, it has made a good beginning. The following committees have been appointed: Committee on statistics, H. L. Whittemore, chairman; committee on manufacture, George K. Burgess, chairman, and committee on tests, F. C. Langenberg, chairman. The committee on statistics will visit steel manufacturers and users, including among the latter both large and smaller railroad lines, to obtain information on material high in phosphorus and sulphur which has either failed in service or which has proven satisfactory. The committee will also prepare a bibliography of this subject for the use of the joint committee.

The committee on manufacture will supervise the manufacture of all steels to be prepared under the program of tests adopted by the joint committee and revised from time to time. Members of the committee or their representatives will be present at all essential operations in the manufacture of steels to be tested.

The committee on tests will receive all material as submitted to it by the other two committees and make suitable tests upon it in accordance with the program of tests outlined by the joint committee. It is planned that standard A. S. T. M. methods of testing will be followed, subject to such modifications as may seem desirable. Special proof and service tests, including impact and endurance tests will be made where possible. The committee will also endeavor to determine the amount and types of gases present in steels under investigation. At present it is planned that material will be tested in the laboratories at Watertown Arsenal, Watertown, Mass.; the Naval Experiment Station, Annapolis, Md.; the Bureau of Standards, Washington, D. C. The various tests will be carefully supervised by the committee. Routine tests will be witnessed by at least one member of the committee, and proof, service and other special tests by at least two members.

The joint committee has determined to study first the effect of sulphur, inasmuch as that presents the most urgent problem economically. The committee on manufacture has supervised the manufacture of a number of tons of rivet steel, and will select all material which is approximately constant in chemical content as to carbon, manganese and phosphorus, with sulphur varying from 0.03 to 0.08 per cent. About a ton of material in each grade will be obtained, of which half will be submitted to the committee on tests and the remainder held in reserve for purposes of check tests. This material falls under group No. 1 of Series A tests. A beginning has been made in the tests of Series B by arranging with a large steel company for the manufacture of three heats of steel—covering plate and structural steels, forging steels, and wheel, tire and rail steels—from each of which eight ingots will be poured to obtain varying sulphur from 0.04 up to 0.15 per cent, by the addition of sulphur or iron pyrites.

The greatest interest has been shown in this investigation. Manufacturers have given it their very hearty support, having agreed to furnish the material necessary to conduct it. The Government departments have offered the facilities of their laboratories, as have also the manufacturers and several of the large railroads. The various interests represented on the joint committee have agreed to assume such expenses of the investigation as come up naturally in the course of their participation therein, so that up to the present the joint committee has not found it necessary to raise a general fund for this purpose; nor is there any reason to believe that, for the present at least, the raising of such a fund would be necessary. Financial matters have been delegated to a committee on finance. It is hoped that this investigation will receive the hearty support of all persons and organizations interested.

Merger of Foundry Equipment Companies

The American Foundry Equipment Co., Chicago, the name under which the Sand Mixing Machine Co. and the Rich Foundry Equipment Co. combined in August, 1919, has acquired the Buch Foundry Equipment Co., York, Pa., which adds to the campany's line of foundry equipment, corrugated steel flask bars, snap flasks and jackets. The American Foundry Equipment Co. will operate the factory of the Buch company until the completion of its plant in the Kenwood manufacturing district of Chicago about May 1, when the three companies will be removed to the new quarters.

A Norwegian firm is reported to have worked out a general process for reducing tungstic acid into tungsten powder and molybdenum sulphide into metallic molybdenum. It claims that the final products, which are in the form of small tablets, are completely free from sulphur, carbon, or oxygen, and that the price for converting the ores into metal is lower than by any other process known. The firm is at present projecting a plant for the reduction of tungstic acid in Norway.

SCANT FUEL SUPPLY

Many Plants in the Mahoning Valley Affected—Some Compelled to Suspend

Schedules of Mahoning Valley mills are dependent altogether on uncertain fuel supply and accelerate or curtail as the supply varies. To complicate operating difficulties, a mild epidemic of influenza is causing sickness among workmen. Jan. 29 the Carnegie Steel Co. suspended the Upper and Lower Union mills, throwing 2,500 men temporarily out of employment. All independent companies are operating with scant fuel supplies. The Youngstown Sheet & Tube Co. has started No. 2 furnace at Hubbard, which was banked for a week. Two of its stacks are idle, No. 1 at Hubbard and one in the East Youngstown group. Retarded railroad car supply is also hampering shipments, 60,000 tons of finished material piling up in local mill yards at one time.

The wire department of the Youngstown Sheet & Tube Co. has resumed after a ten days' layoff. The company is sold five months ahead in its wire products. Fence demand from South America is strong.

Because of steel scarcity, 21 hot mills at the Farrell, Pa., works of the American Sheet & Tin Plate Co. suspended two days. The nine double mills are operating.

Independents have been compelled to suspend in rolling departments in a number of instances. Operating superintendents complain also that the quality of coal being shipped is poor, difficulty being encountered in melting open-hearth charges.

Uncertain operations, cutting down production, are increasing the demand for steel in all forms. An indication of the sheet demand is the statement by the management of the new Newton Steel Co. that its entire output for the year could be disposed of. Some sales of No. 28 gage galvanized sheets at 10c. are reported and No. 28 black at 8.50c., but these represent maximums. Scarcity of semi-finished material is holding down production of finished product where makers must depend on the market for their requirements.

Agitation for creation of a new nail card is due primarily to inequalities which makers claim exist in extras, especially in the smaller sizes. Since 1896 there has been no change in extras, with the result that, in the smaller sizes of nails, cost has run away with the selling price. One Youngstown district producer states certain of the lesser sizes are manufactured at a very close margin and some at a probable loss. It is to correct these inequalities that a new card is proposed.

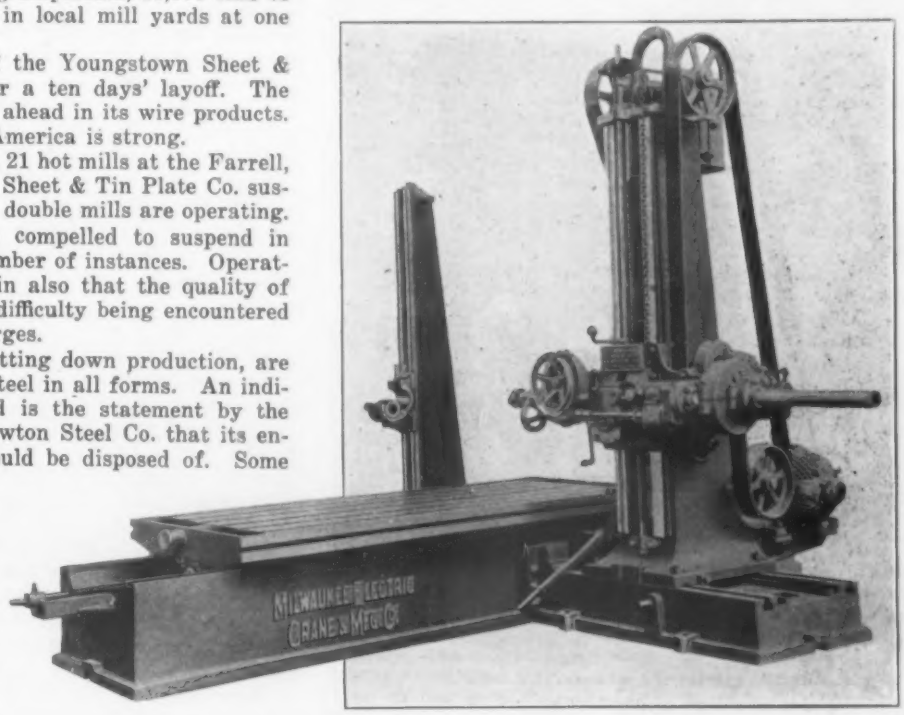
Horizontal Drilling Machine for Long Pieces

A horizontal drilling machine with planer type table and bed is announced by the Milwaukee Electric Crane & Mfg. Co., Inc., Milwaukee. It is designed to cover a wide range of drilling and boring, but is explained as being especially suited for operating, at one setting, on pieces too long or bulky for the usual type of machine.

Carriage elevating and lowering mechanism is operated by power or hand and the driving gear is provided with a limiting torque clutch to secure safety to the mechanism in case the carriage is clamped too hard to the column when the power drive is thrown into gear. The hand adjustment is used only to secure final setting of the carriage. A steel scale on the face of the column indicates the distance from the top of the table to the center of the spindle and a corresponding scale is carried by the outboard column.

The drill column is mounted on a side extension of the bed and is movable to or from the table to suit the size of the work and reduce the overhang of the spindle. This is emphasized as an advantage in many cases where end milling and facing is necessary and secures more accurate spotting of the drill than is possible with a long overhang.

The spindle is geared for standard speeds of 20 to 400 per min., which may be increased or reduced when special service is to be met. With a 4 to 1 motor speed range and 16-point controller, 32 different speeds are obtainable with a single back-gear ratio of about 5 to 1. The front end of the spindle is fitted with a ball thrust bearing and No. 5 Morse taper hole, arranged with special cross key and nuts for drawing up and releasing boring bars or tools. The spindle quill is arranged to automatically cut out the drive when the spindle reaches the extreme in or out run of the feed range, thus to eliminate danger of stripping the feed mechanism by over-running when the feed is worked near the extremes of the run. Power is transmitted through a maximum



Drilling and Boring Machine Especially Adapted for Operating at One Setting on Pieces Too Long or Bulky for the Usual Type of Machine

of four reductions of spur gears to secure minimum boring speed and maximum torque. The standard spindle feeds provided are 9, 14, 20, 30, 50 and 70 thousandths per revolution. The feed is cut in or out by a trip lever and quick return or advance secured by a hand wheel on the quill-pinion shaft.

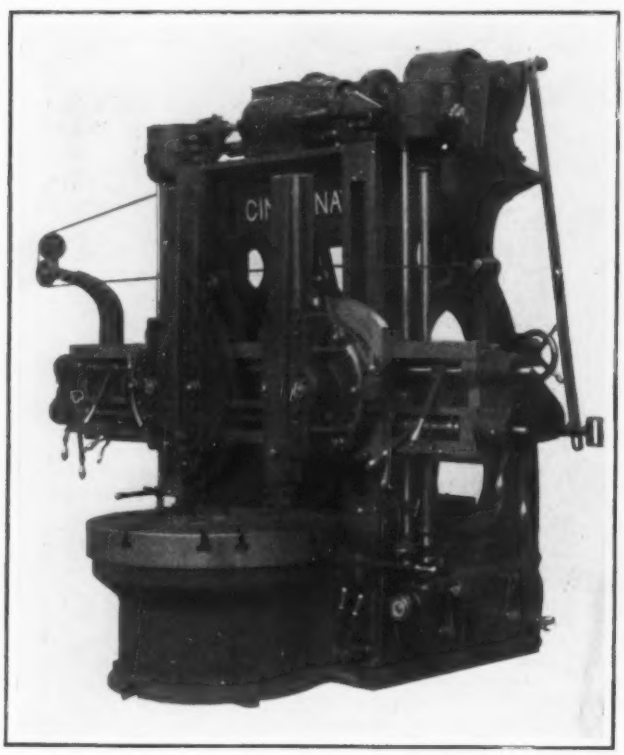
The standard table furnished is 4 ft. wide and 9 ft. long, and slides on a 15-ft. bed. Suitable tee slots are provided for clamping the work or fixtures, and the front edge of the table is tee slotted for bolting on special indexing plates or fixtures for accurately locating shaft bearings or other holes in duplicate work. Tables longer or shorter than the standard length can be furnished to meet special requirements.

The drill is operated by a 3½ to 5-hp. 4 to 1 variable speed motor. The starting, stopping and reversing lever is placed on the spindle carriage within convenient reach of the operator. The drill can be lifted from the base plate and used as a self-contained and complete portable drill in connection with any floor plate.

Electric locomotives for industrial purposes were discussed in a joint paper by Walter Fixter and Kenneth Andrew, Baldwin Locomotive Works, Philadelphia, presented at a recent meeting of the Philadelphia Section of the Association of Iron & Steel Electrical Engineers. A copy of the paper can doubtless be had by addressing John F. Kelly, secretary, Association of Iron & Steel Electrical Engineers, 513 Empire Building, Pittsburgh.

A Small Heavy Duty Boring Mill

The Cincinnati Planer Co. is putting on the market a bevel gear type of boring mill in 42 and 48-in. sizes. The machine may be described as a small heavy duty boring mill, as the construction aims to ensure maximum strength and rigidity. Features incorporated into the mill include a forced lubrication system or spindle and track, and speed box bearings, sensitive adjustment of heads and a safety device which prevents breakage of gears in case of accident. An automatic brake is also provided for stopping the table almost instantly. This brake is operated from the same handle which controls the starting clutch. The rapid power traverse and feed mechanism are so arranged that both cannot be engaged at the same time. All levers are placed in



48-In. Boring Mill, Bevel Gear Type, Manufactured by Cincinnati Planer Co.

front of the machine within easy reach of the operator, thus avoiding all unnecessary steps around the machine.

These mills have a capacity of 2 in. over the rated size. The table is large in diameter and rigidly constructed. It is regularly furnished with both radial and parallel T-slots and is driven by a large accurately planed bevel gear. The large bevel pinion which meshes into it has a double bearing in the bed, thus to assure the smoothest possible motion to the table. The table spindle revolves on a large angular bearing having a self-centering tendency, and all side strains are taken by vertical bearings at either end of the spindle. The bed is deep and heavily ribbed. It has a box form of construction, with which the speed box is cast integral. The housing seats are long and wide. The housings are of box section, with wide faces, and designed for the greatest possible rigidity. They extend to the bottom of the bed and are locked to it by two large tongues, in addition to the bolts and dowels. They are securely tied at the top by a heavy box arch. The cross rail is of heavy box form, having a deep arch at the back, and is clamped both on the inside and outside of the housing face. The cross rail is raised and lowered by power from the driving motor. The heads have a long, narrow guide bearing at the bottom of the rail, preventing all tilting or cramping when taking heavy cuts, tending to relieve the feed mechanism from excessive strains, and also insuring permanent alignment. The heads are square locked throughout, and have tapered gib adjustment for taking up the wear.

The tool bars are of box section, and have an exceptionally long bearing in the saddle. The tool posts are made from solid forgings, and held in the tool bars by three binder bushings of special design, and are further provided with a heavy key to resist all torsional strains. Both heads have rapid power traverse in all directions, operated independently of each other, and controlled from the levers at the front of the machine. These levers can be adjusted in height to suit the operator. The feed mechanism is of the tumbler gear type, and is entirely independent for each head. Eight feeds are provided, ranging from 1-40 to 1-2. All gears are covered, and the gears on the end rail are entirely enclosed. They are all of steel. All bearings, including the tumbling gear bearing, are oiled from a central position.

The speed box is cast solid with the bed. Four mechanical changes of speeds are provided through positive jaw clutches which can be operated from either side in front of the machine. An independent friction clutch on the first driving shaft is used to stop and start the mill, and an automatic brake for stopping the table is operated from the same handle which controls the starting clutch. For belted drive or constant speed motor drive a three-step cone is mounted on rear of speed box shaft, and a patented belt-shifter is provided so that the operator need not touch the belt. All driving gears in the speed box are steel, and run in a bath of oil at all times. A 10-hp. motor is required, and where direct current is available a 2 to 1 variable speed motor not exceeding 500 to 1000 r.p.m. is recommended.

Reduced Earnings of the Brier Hill Steel Co.

Reports read Jan. 27 at the eighth annual meeting of the Brier Hill Steel Co., Youngstown, Ohio, reflect the effect of unsettled business conditions in 1919 on the steel industry in the Mahoning Valley. Production, sales and earnings fell short of the 1918 record and in other respects the report was less favorable than the one read a year ago.

Perhaps the most significant statement was that the steel strike cost the company $1,230,291, including strike expenses and lost tonnage output. In 1919 the company produced 349,789 tons of finished steel and shipped 337,835 tons. Shipments compare with 467,925 tons in 1918.

Gross sales of $29,090,327.71 in 1919 compare with sales in excess of $43,000,000 the year before. Net earnings of $1,136,421.59 for last year compare unfavorably with the figure of $4,470,792.84 in 1918. Surplus at the close of 1918 was $19,197,819.80, and was $17,643,699.82 on Dec. 31, 1919. The surplus is somewhat in excess of the par value of outstanding common and preferred stock, which is $17,319,700, including $5,000,000 of 7 per cent cumulative preferred and $12,319,700 of common.

Plant and property valuation of $28,586,605.01 is $11,267,605.01 in excess of outstanding capital stock of both issues.

Variance in these two reports is attributed to uncertain business conditions in the first half of 1919 and labor and transportation difficulties the last half.

Stockholders elected these directors: James B. Kennedy, James H. Grose, George F. Alderdice, John Tod, Joseph G. Butler, Jr., W. A. Thomas, John Stambaugh, R. C. Steese and Fred Tod.

A by-law was amended making the chairman of the board, James B. Kennedy, chief executive officer of the corporation. In addition he will continue to act as general counsel for the company. James H. Grose, formerly district superintendent of the Carnegie Steel Co. in the Youngstown district, and elected president of the Brier Hill company Jan. 10, was re-elected president at the yearly meeting and placed in direct charge of all operations. George F. Alderdice, vice-president in charge of operations for a number of years, was elected first vice-president, in place of John Tod, chosen a vice-president with Joseph G. Butler, Jr.

Other officers elected by directors are J. E. Parker, secretary; N. B. Folsom, treasurer; E. L. Ford, chairman of the advisory committee. This committee consists of E. L. Ford, W. A. Thomas, John Stambaugh and John Tod.

PENDING TARIFF BILLS

Decided Difference of Opinion in Regard to Magnesite Protection

WASHINGTON, Feb. 3.—Action on two tariff bills in which the steel industry is interested will be taken by the Senate Finance Committee within the next week. These are the bills providing protection for the domestic magnesite and tungsten industries which were developed during the war to supply products previously imported. Both bills were passed by the House of Representatives several months ago and have been under consideration recently by the subcommittee of the Senate Finance Committee.

A large number of witnesses have appeared in opposition to the magnesite bill. This opposition comes from two sources. One is the American Refractories Co., Pittsburgh, which has $2,000,000 invested in magnesite in Austria. It is contended by this company, which holds a 10-year contract to supply the United States Steel Corporation, that passage of the proposed bill imposing a duty of from $10 to $15 per ton on magnesite would ruin its business. It is plain that not only would it render its Austrian investment worthless, but also a $500,000 investment in a brick works at Baltimore, where the Austrian magnesite is to be made into brick for use in steel furnaces.

The other source of opposition is a group of users of magnesite who say that the domestic magnesite produced in California and Washington is either inadequate or inferior for their purposes and that the proposed tariff would place too great a burden upon them. This group consists chiefly of manufacturers of magnesite composition flooring and stucco, which are used extensively in the building industry.

One of the witnesses before the subcommittee was W. H. Bischoff, assistant general superintendent of the Lukens Steel Co., Coatesville, Pa. Mr. Bischoff formerly was in charge of the open-hearth department of the Bethlehem Steel Co., and later was assistant general superintendent of the Dominion Iron & Steel Co., Sydney, Nova Scotia.

Mr. Bischoff's testimony was to the effect that domestic magnesite is not equal to the Austrian magnesite for use in steel furnaces.

"Since the outbreak of the war, and since the Austrian magnesite on hand was consumed, we have not been able to get a brick that will stand up in service as the old Austrian brick would," said Mr. Bischoff. "Basic open-hearth furnaces which have bottom and side walls up to a point of six or eight inches above the metal, are built of magnesite brick, and on top of this magnesite brick the front and back walls and the roof are built. After the brickwork has been built, we put the gas on the furnace and burn in a bottom of gray magnesite. This bottom runs all the way up to a little bit above the slag line. We find with these brick made from domestic magnesite that they spawl very rapidly; as soon as we bring the furnace up to heat, pieces break off the end of the brick. I have seen them as big as 3 inches. The brick are laid on flat with the corner in toward the furnace. That weakens what is really the foundation for the silica brick wall which carries the roof. We have to repair when the furnace is hot so that we not only lose the tonnage of the furnace, but lose the coal we are burning to heat it. The actual cost of magnesite is negligible compared with the tonnage lost on account of these delays. I have not any actual figures on the difference in tonnage lost, but simply as an illustration, if we would lose only an hour a week on account of the difference in the quality of the magnesite, it would be 48 to 50 hours in the year, or practically two days per furnace, and on the 22 open-hearth furnaces that we operate at Lukens, that would mean practically a month and a half of time lost. The trouble is with the brick we find in our repairs when we take the furnaces down for repairs. We find it has disintegrated and then we begin to worry whether that is not also true of the brick underneath. The furnace bottom is the most vital part of the furnace in steel manufacture. Something may happen to the roof and we are very often able to get that heat out and pour it, but if we are not able to do that we allow the heat to chill down and then build a new superstructure. But if anything happens to the bottom of the furnace and it begins to boil, the open-hearth man must use his judgment as to whether he can leave it there long enough, and if he leaves it there too long, he loses 80, 90, or 100 tons of liquid steel which runs all over his plant, and he cannot recover it at all. So the open-hearth man feels that he should have the best available material to put into that part which is the most vital part of his furnace."

The magnesite producers in California and Washington have based their claims on the value of developing the domestic industry because of its importance in time of war. Roy N. Bishop, vice-president of the Northwestern Magnesite Co., Chewelah, Wash., charged before the subcommittee that the American Refractories Co. in effect represents the Austrian magnesite trust and the fact that the company's plant in Austria was used by the Austrian Government during the war was cited as an example of the value of developing industry within a country's own borders. Officers of the American Refractories Co., however, presented evidence showing that their company was owned entirely by Americans, except that 15 per cent of the capital stock was given to German interests in exchange for the magnesite rock in Austria.

Railroads Declared Common Carriers

WASHINGTON, Feb. 3.—In the case of the Empire Steel & Iron Co. against the Director General of Railroads and the Central Railroad of New Jersey, the Interstate Commerce Commission has held the Mount Hope Mineral Railroad and the Ironton Railroad to be common carriers. The application of rates on iron ore and through traffic from and to Mount Hope Railroad stations made in combination on Wharton, N. J., is held by the commission to have not been shown to have been unreasonable or unduly prejudicial; and the increased rates in effect since Jan. 25, 1918, are found to have been justified. The refusal of the trunk lines to maintain joint rates, including terminal and spotting services to and from the Thomas Iron Co.'s furnace tracks at Hokendauqua, Pa., while at the same time maintaining such rates, including terminal services at competitive furnace points in Eastern Pennsylvania, are found to have been unduly prejudicial. Failure of the trunk lines to compensate the Thomas Iron Co. for services heretofore performed by the company in the delivery of outbound traffic is found not to have been unreasonable, but the company is held to be entitled to reasonable compensation in the future.

The Interstate Commerce Commission has held that the rate of 50c. per 100 lb. for the transportation of scrap iron in car loads from Texarkana, Ark.-Tex., to Chicago, is unreasonable to the extent that it exceeded 30c., the rate contemporaneously in effect from Texas points to Chicago. The complainants in the case were the Karchmer Iron & Metal Co., Oklahoma City.

Proposed Detroit-Windsor Bridge

DETROIT, Feb. 4.—While he would not go so far as to say that data in regard to traffic conditions and possibilities between Detroit and Windsor already compiled by himself had proved sufficient to satisfy his backers that a $28,000,000 Detroit-Windsor suspension bridge would be a good investment, Charles Evan Fowler, of New York, chief and consulting engineer on the project, asserted this week that prospects are favorable for a start on actual construction work before the end of the present year. Mr. Fowler said that the Detroit-Windsor traffic survey is under way but is yet far from complete.

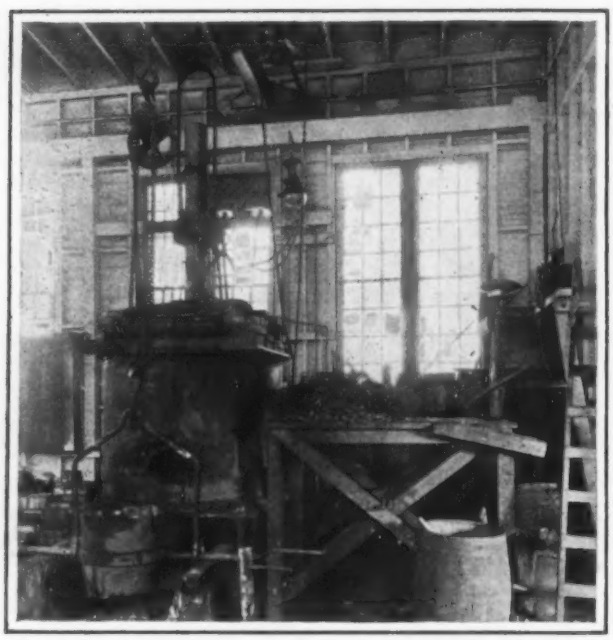
According to Mr. Fowler, the bridge will be financed by Toronto, Montreal and New York capital, together with some from Detroit and Windsor. He declared that no stock company will be formed for the purpose of selling shares, as sufficient money will be available from private sources.

CAST IRON FROM STEEL SCRAP

Electric Furnace with Carbon Bottom Making Castings on the Pacific Coast

A UNIQUE electric furnace for making gray iron castings from iron or steel scrap is operating on the Pacific Coast. Attention was called to this furnace by Robert Gregg, foundry superintendent of the plant where it is in use, during a discussion of gray iron foundry problems at the American Foundrymen's Convention in Philadelphia last October. The furnace is operating at the plant of the Hesse-Martin Iron Works, Portland, Ore., and was especially designed by the company. A feature is that it has a carbon bottom made of approximately 85 per cent coke and 15 per cent pitch.

A description of the furnace, as furnished THE IRON AGE by Mr. Gregg, is as follows: The body is a steel



Special Electric Furnace of Half-Ton Capacity With a Carbon Bottom for Making Iron Castings From Steel Scrap at the Hesse-Martin Iron Works, Portland, Ore.

plate shell, 60 in. in diameter, 48 in. high, lined with a mixture of coke and pitch. The roof is of fire brick. One electrode enters through the roof; the other is a cast iron plate placed in the bottom of the furnace, covered with carbon as high as the tapping out spout. The illustration shows the general appearance as it is used at present.

The furnace has a capacity of 500 lb. per charge of steel scrap, which is melted down and refined and then the necessary additions are made, such as ferrosilicon and carbon to procure whatever analysis one may desire to suit the product specified. The furnace is started at 7 a. m. and the first heat poured at 9:30 a. m. and then one every two hours the remainder of the day. The grade of work cast is pulleys, manifolds, valves, etc.

The iron so produced is claimed to be very easy to machine as well as very strong. A test bar 24 in. by 2 in. by 1 in. thick had a breaking strength of 3760 lb., a deflection of 0.063 in. and a modulus of elasticity of 67,700, tested on the flat. The shrinkage of this iron was 0.152 in.

Analyses of some of the iron made in this furnace as furnished by the Pacific Coast Testing Laboratory are as follows:

Sample	Combined Carbon, Per Cent	Graphitic Carbon, Per Cent	Silicon, Per Cent	Sulphur, Per Cent	Phosphorus, Per Cent	Manganese, Per Cent
304	1.11	1.84	1.87	0.018	0.047	0.58
305	1.14	1.80	1.87	0.014	0.047	0.62
330	0.90	2.42	1.84	0.028	0.047	0.68
331	1.02	2.22	1.76	0.030	0.062	0.55
332	0.92	2.30	1.83	0.021	0.048	0.59
333	0.86	2.25	2.17	0.031	0.060	0.53

The mixture represented by samples 304 and 305 was made of all steel punchings with 1.70 per cent silicon added. The mixture represented by the other four samples was 50 per cent each of steel and iron turnings and 1.75 per cent silicon added. Test bars from this iron, 1¼ in. round on 12 in. centers, broke under an average load of 3600 lb. with a deflection of 0.17 in. These tests were made last November.

Mr. Gregg reports that manifolds made for use on steel ships under specifications calling for a hydrostatic pressure of 750 lb. was tested to a pressure of 1220 lb. without any sign of breakage or fracture. This contrasts with some made by the cupola process which broke under a pressure of 550 lb.

National Laboratory Foundation

A movement has been launched to establish a National Foundation for the Development of Invention and Industry. It originated with an association of inventors brought together during the war, who called a convention at the Hotel Astor, New York, on Jan. 9. A temporary organization was effected to formulate plans and present to a later convention a definite outline of the proposed scope, purposes, classes of membership and organization of such a foundation.

Among the men appointed on this board were: L. W. Luellen, vice-president Individual Drinking Cup Co.; Maj. Howard Elliott, director of finances United States Signal Corps; Dr. Charles P. Steinmetz, General Electric Co.; Noel J. Statham, West Virginia Pulp & Paper Co.; Simon Lake, president Submarine Boat Co.; Prof. William H. Burr, civil engineer, New York; Prof. Charles F. Chandler, Columbia University, chemical expert; Dr. William M. Grosvenor, industrial chemist, New York; L. S. Gardner, vice-president Gardner Carburetor & Brass Works, Detroit; W. L. Landis, American Cyanamid Co.; Prof. J. C. Olsen, secretary American Institute of Chemical Engineers; H. S. Cuntz, consulting engineer; Lawrence A. Subers, chairman of the executive board, Buckeye Rubber Products Co., Cleveland.

It has already become apparent that the foundation of a laboratory is not the most important function of the projected organization, but rather that it should serve as a national clearing house of inventive ideas. It is held that in the past foreign nations have often reaped first and reaped most largely the fruits of the inventions of American minds because American inventors were discouraged in the development and commercializing of their improvements. The foundation proposes among other things to assist the inventor in developing his idea and to secure adequate advice and means to produce and market his product. The institution is to be philanthropic, the financing accomplished largely through donations and subscriptions.

Heater Furnishes Hot Water for Factories

The Russell storage heater, intended to furnish hot water in factories, hotels, etc., has been placed on the market by the Griscom Russell Co., 90 West Street, New York. Exhaust or live steam is supplied to the heating element, where it condenses and heats the water in the tank.

The heater is designed with straight tubes instead of U tubes in the steam element. These tubes are explained as being of sufficient length to insure that the required heating will be taken care of and all of the steam will be condensed when it reaches the rear end of these heating tubes. In contrast with the U-tube type of heater, it is pointed out that there is provided only a sufficient area of drain tube section to carry the condensation back to the steam head.

The heating surface consists of seamless drawn brass tubes expanded into a fixed tube plate at one end, and a floating tube plate at the other end, thus to permit expansion and contraction of tubes without strain of the tube joints. The tubes are all of the same length, which reduces the spares necessary to be carried in stock, and in case of need permits the purchase of stock tubing to replace worn out tubes. The shell is regularly furnished of welded construction, but can be furnished of riveted construction if preferred. A manhole can be provided for easy access to shell for inspection and cleaning.

COMMANDEERED RAILS

Washington Gossip as to the Cause for the Recent Action

WASHINGTON, Feb. 3—Although the Railroad Administration's exercise of War Department war powers to obtain steel rails for its various lines caused no heated excitement, it has brought out a lot of speculation as to just why such a step was taken. Apparently few observers are willing to take the word of either Director General Hines or Acting Secretary of War Crowell that it was merely a case of getting rails by the most expeditious route. Of course, it bridged over the trouble which was built up by the Railroad Administration's refusal to go out into the steel markets last spring for the rails it needed then. But the use of a war power 15 months after the cessation of hostilities ought to have more behind it.

Probably the most interesting information that has leaked out is the definite statement from the office of the Secretary of War that no one in that department had anything to do with the transaction, other than to sign the papers sent over by the Railroad Administration. The actual signing was by Mr. Crowell, for Secretary Baker was home sick, but he first obtained Mr. Baker's approval. This act was the more extraordinary, as the War Department has itself made no such use of its powers since the guns stopped roaring in France.

In fact, the only act of the administration on a par with it, was the commandeering of battleship steel a year ago by the Navy Department. But that was at least done for Navy account and not for some other branch of the Government.

Washington generally seems to have expected a little more complaint from the steel companies against this exercise of war powers, but if so, it has been disappointed, for so far there have been no signs of a fight. There is some difference of opinion, however, as to the prices which Mr. Hines will ultimately have to pay for the rails so commandeered. Although he is expected to struggle hard against paying more than $47 a ton, which has been accepted by some of the companies, War Department officials seem inclined to construe the "fair and equitable" price adjustment more liberally, and believe that the high cost companies will find it possible to realize higher prices when the prices are finally fixed "by the President."

The order issued by the Secretary of War, at the request of the Railroad Administration, commandeered under his war powers 72,500 tons of steel rails. This commandeering order followed the placing of orders by the Railroad Administration for 42,500 tons of rails, of which 25,000 tons were placed with the Illinois Steel Co., 15,000 with the Lackawanna Steel Co., and 2500 with the Colorado Fuel & Iron Co.

Of the 72,500 tons commandeered, 36,000 tons were ordered from United States Steel Corporation companies, including 12,000 each from the Carnegie Steel Co., the Illinois Steel Co. and the Tennessee Coal, Iron & Railroad Co. Other items making up the total included 26,000 tons from the Midvale Steel & Ordnance Co. and 10,500 from the Bethlehem Steel Co.

The price at which a considerable portion of the amount will be taken over including that from the United States Steel Corporation companies is $47 a ton. The price for the other companies will be agreed upon later under the provisions of the statute, which says that whatever is commandeered shall be paid for at reasonable prices to be fixed by the War Department. The Midvale company recently bid $57 a ton. It was assumed that the commandeering order was decided upon partly because of the price sought by Midvale.

It is expected that no further orders for rails will be placed by the Railroad Administration prior to the return of the railroads to private control on March 1. It was estimated recently that the Railroad Administration could use 280,000 tons before March 1. The amount actually commandeered, it is expected, will take care of the urgent needs. The Railroad Administration has conducted its negotiations for rails with an apparent effort to maintain secrecy on the proposition. It was not until word of the commandeering action had got out through the steel trade that it was admitted that such action had been taken.

Walker D. Hines, Director General of Railroads, made the following statement relative to the matter after news of the commandeering action had become known through other channels:

"An erroneous impression has been created by publications regarding the action of the Railroad Administration in arranging to secure steel to meet its urgent needs. The Railroad Administration urgently needs approximately 120,000 tons of steel rail which it ascertained should be rolled in about three weeks. It is essential that this rail be secured as promptly as possible.

"The Railroad Administration has been seeking since October to secure sufficient rail, but found it impossible to do so, largely because of conditions arising out of the recent steel strike.

"In view of the urgency of the situation, commandeering orders for a part of the needed rail have been issued on the request of the Railroad Administration. The price to be paid to some of the mills for rail delivered under these orders has been agreed upon at $47 per ton, and as to others a reasonable price will be fixed in accordance with the provisions of the statute." O. F. S.

Steel Situation in Nova Scotia

WASHINGTON, Feb. 3.—A review of the steel situation in Nova Scotia forwarded to the Bureau of Foreign and Domestic Commerce by Vice-Consul Franklin J. Crosson at Sydney states that after the depression in the industry during early fall, there has been increase in activity. Mr. Crosson says:

"The depression in the local steel industry was somewhat relieved by transatlantic orders received early in October, when one blast furnace was relighted; one-third of the open-hearth capacity was resumed; the bloom, billet and rod mills placed on single shift, and an increased capacity developed in the wire and nail departments. About Nov. 15, the steadily increasing demand for rods warranted the institution of two shifts in the rod mill, which has since operated to its capacity of about 7800 gross tons monthly.

"More recent developments have now resulted in preparations for further increases in steel capacity immediately after Jan. 1. An order for 7500 tons of rails for the Rumanian market is to be rolled, while the tonnages booked for wire products, rods and billets demand a maximum output of these commodities over the next three months or more."

Frasse Steel Co. to Build Additions

The Frasse Steel Co., recently incorporated under the laws of Connecticut for $1,000,000, will reconstruct its plant at Hartford at a cost of $100,000 and will take over the business of the Peter A. Frasse Co., New York. The additions to the plant will comprise an extension of the present shop building, which will be 25 x 320 ft.; a building in front of the present office, the first two stories of which will be 90 x 175 ft., while the third story will be 75 x 90 ft. The loading platform on the railroad side of the plant, 40 x 320 ft., will be enclosed to provide more storage space for raw materials and finished products awaiting shipment.

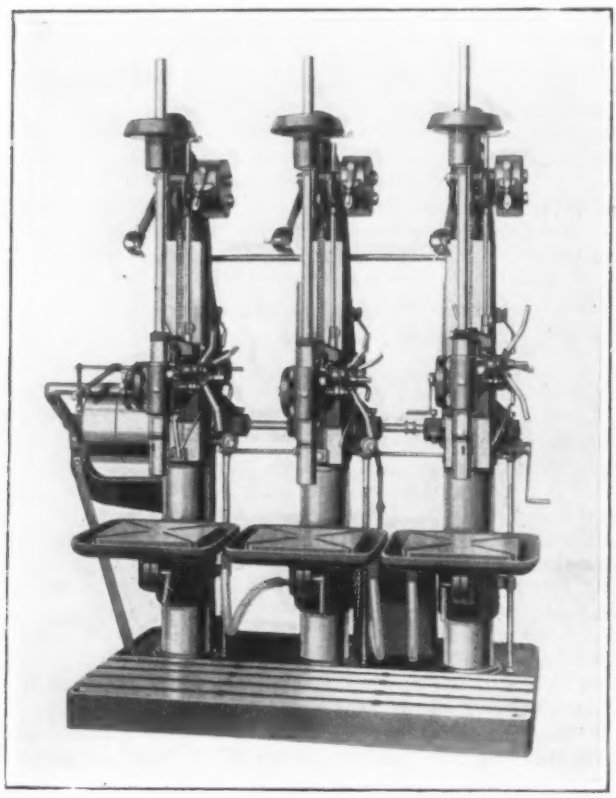
The capacity of the plant will thus be increased from 40,000 to 50,000 tons a year, the present output being 26,000 tons. Alterations will start about March 1. The original company, Peter A. Frasse Co., of New York, will act as sales agent for the new company outside of New England. The directors of the new Connecticut corporation are: A. E. Brion, president; R. C. Stacy, vice-president; Lester Brion, treasurer; R. K. Newman, secretary; Theodore Hager, Arthur B. Mead and Fred Becker.

Common labor in Norway is now getting 150 to 225 crowns a week, which at normal exchange is equivalent to $40 to $60 a week.

All Geared 26 In. Sliding Head Gang Drill

A 26-in. sliding head all-geared gang drill made in independent column style and for heavy duty is announced by the Barnes Drill Co., 814 Chestnut Street, Rockford, Ill. The machine is described as having the strength and power of the ordinary 36-in. cone belt-driven drill with the added advantage of being more conveniently arranged for quick control.

There are eight changes each of geared speeds and of geared feeds on each spindle, all independent of each other and all under control of the operator from the front of the machine. With the driving pulley running 325 r.p.m., speeds for each spindle range from 230 to



Heavy Duty Work with Quick Control Was the Objective in Designing This Sliding Head Gang Drill

23 revolutions. The feeds on each spindle range from 0.005 to 0.075 in.

The spindles are 1 15/16 in. in diameter and are double splined. The distance from center to center of the spindles is 24 in. Each sleeve has 14-in. travel and the drift hole is below the sleeve. The steel crown and pinion gears are cut four-pitch, the diameter of the crown gears are 10 7/16 in. and the diameter of the crown pinions 5 in., these sizes being emphasized as sufficiently large to make a strong drive.

The head and spindle are counterbalanced, the weight being suspended by a roller bearing sheave wheel. The head is gibbed to the column face, and is held at any point within the long travel by two quick-acting clamp screws. The head is raised and lowered by a crank pinion operating in a rack; a desirable feature for boring bar and deep hole work. An adjustable stop is supplied to clamp on the column face so that the sliding head may be quickly brought back to exactly the same place each time the head is raised. The sliding head has a vertical travel of 23 in.

The machine is rated to drive a 2-in. high-speed twist drill at 0.041-in. feed per revolution of the spindle, or at the rate of 6½ in. per min. in cast iron, without the back gears. Suitable feeds are available for boring bar work, and the machine is rated to bore out an 8-in. hole.

The multiple disk friction clutch gears, giving a reverse speed of 1¾ to 1, are on the driving shaft of the machine, and not on the spindle, emphasized as a feature as the machine is geared down 13 to 1 in front of the clutch gears, thus to eliminate the excessive wear and tear of clutches that are placed directly on the spindle.

Any or all of the spindles can be supplied with an automatic reversing mechanism, of advantage particularly for depth tapping. The trip can be set so that the instant the tap reaches the depth required the spindle will automatically reverse, backing out at increased speed. The shifting lever can be set so that when tripped automatically or by hand it will return to neutral position, thus stopping the spindle instantly instead of reversing it.

Automatic Tumbling Barrel

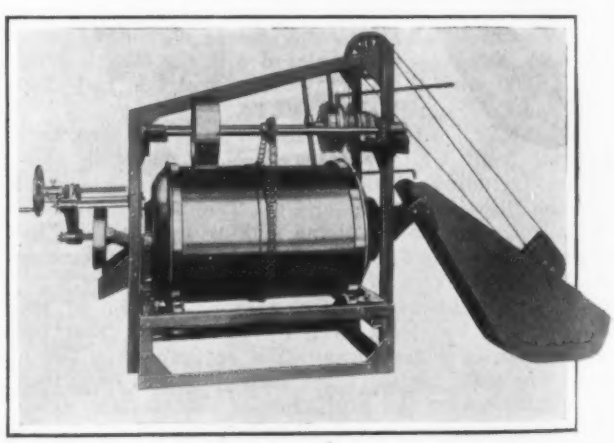
An automatic tumbling barrel which has the action of an ordinary tumbling barrel with the addition of a number of new features has been placed on the market by the Ideal Concrete Machinery Co., Cincinnati. The barrel loads automatically from ground level and discharges the work directly into buckets without having to stop the barrel, thus to save both time and labor.

The work is held in the drum as long as desired, and the operator can reach in and take out a sample of the work at any time, thus to prevent over tumbling or not sufficient tumbling. The barrels are built either for exhaust tumbling or wet tumbling, and can also be equipped with slots for use in the separation of trimmings.

In the tumbling operation a plug on the end of the barrel is closed by a hand wheel, allowing the discharge chute to hang straight down in the barrel, preventing its interference with the tumbling action. When ready to discharge the plug is withdrawn and the chute brought into the discharge position. A worm inside the barrel, built of 1½-in. angle iron, cleans the barrel when discharging, but does not crowd the work to the discharge end when tumbling.

The shell of the mill is built of ¾-in. steel plate, butt welded, and either solid or perforated to screen out sand or sawdust, or equipped with axial slots to dispose of trimmings. The drum heads are castings 1¼ in. thick, protected from wear by steel bands shrunk around the running track. The drum travels on 12-in. iron rollers, rigidly fastened to the roller shafts, which run in flexibly hung Hyatt roller bearings. The frame of the machine is built of angle iron, stiffened with gusset plates.

The skip loader is raised by power transmitted from the counter shaft through a 14-in. contracting band



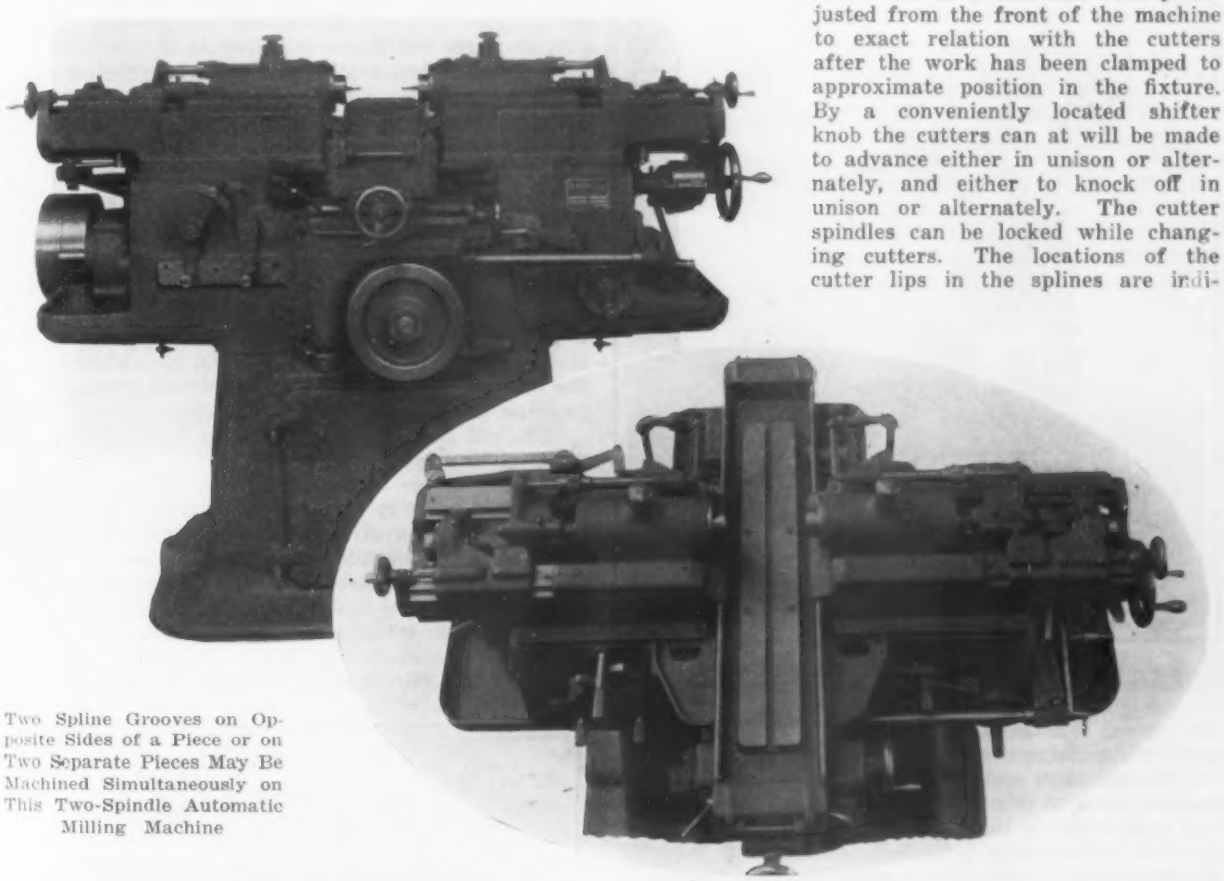
The Tumbling Barrel Is Loaded Automatically from the Ground Level and Discharges Directly into Buggies or Buckets Without Having to Stop the Barrel

hoist, an automatic stop preventing the loading skip from being hoisted too far. Where an exhaust barrel is desired the exhaust is taken care of by the hollow trunnion in the discharge plug, and flexible steel tubing connected to the dust exhausting system. The barrels are explained as being especially adapted to tumbling bolts and nuts, stampings, drop forgings, and small castings.

Two Spindle Spline Milling Machine

A two-spindle spline milling machine, designed by B. M. W. Hanson, has been placed on the market by the Taylor & Fenn Co., Hartford, Conn. It is automatic in operation, and will simultaneously machine two spline grooves up to 6 in. in length on opposite sides of the same piece, single splines of the same or different diameters simultaneously on two pieces, or through slots such as drift pin slots or cutter slots in boring bars and similar work. Once set, the machine will continue to cut a certain depth and length of slot until readjusted. Work up to 5 in. in diameter, and of any length, may be splined.

A V-shaped vise affords a positive clamp for the work beyond the cutter traverse at one end, while the other end of short work, if centered, is supported on a male center, and if uncentered is supported in a female cone. Long work is free to project beyond the confines of the machine, both front and back. No countershaft is necessary, as the drive is direct from a pulley on the line shaft to a tight and loose pulley to the left at the rear of the machine. The shifter rod extends through to the front of the machine, where all other controls are located.



Two Spline Grooves on Opposite Sides of a Piece or on Two Separate Pieces May Be Machined Simultaneously on This Two-Spindle Automatic Milling Machine

A speed box, within the column and to the left, affords six gradations of spindle speeds, from 302 to 1885 r.p.m. The machine must be stopped while speeds are being changed, thus to provide protection against damaged gearing. Ten gradations of feeds, available for the table, are obtained from a speed box containing a cone of five gears and a two-speed clutch, controlled from the front of the machine. Each one of the 10 gradations of table feeds is available with each one of the six spindle speed gradations.

The work table obtains its motion through a lever from a cam mounted at the front under the work slide of the machine. This cam is driven by shafts and gears from the feed box. The table movement may be varied from zero to the maximum of 6 in. The feeds to the spindle housings are transmitted through crank and link mechanism from a cam mounted behind the table reciprocating cam.

A reservoir for lubrication is secured to the door of the column within the body of the machine. When the door is opened this reservoir swings out with it and the supply of cut lubricant can be readily replenished or the reservoir cleaned. The coolant pump is driven at constant speed from the main drive pulley, thus to make the supply of coolant uniform at all times and independent of the speed at which the cutters are driven. From the pump the coolant passes through a system of telescopic tubes to the hollow cutter spindles themselves. Passing through these and through grooves in the shanks of the cutters, it is projected under pressure direct on to the lips of the cutters, cooling them and at the same time ejecting any chips immediately they are formed.

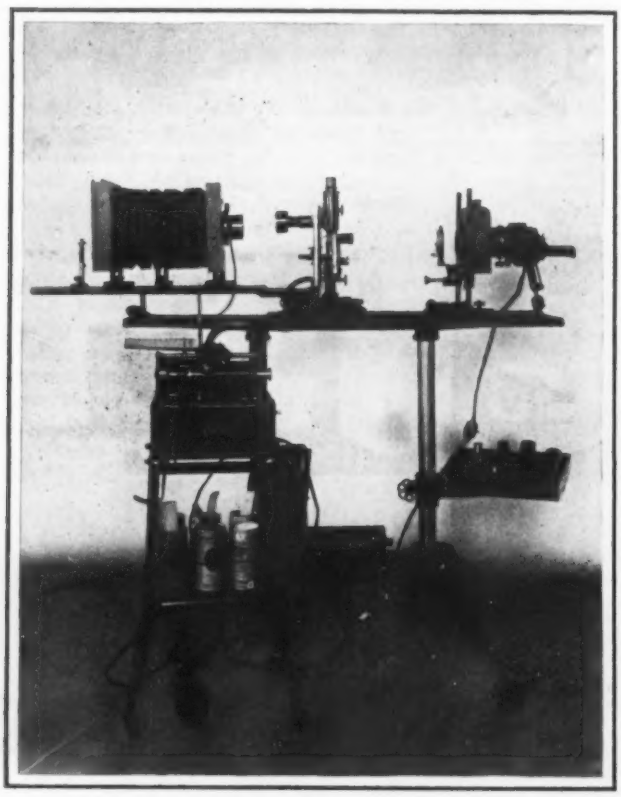
Provision is made so that the table, attached fixture and work as a unit are readily adjusted from the front of the machine to exact relation with the cutters after the work has been clamped to approximate position in the fixture. By a conveniently located shifter knob the cutters can at will be made to advance either in unison or alternately, and either to knock off in unison or alternately. The cutter spindles can be locked while changing cutters. The locations of the cutter lips in the splines are indicated on a plain flat scale on the spindle adjustment slide to the right of the machine.

Railroads Purchasing Rolling Stock

The Union Pacific Railroad has purchased 3000 refrigerator cars, divided as follows, between western carbuilders: 900, American Car & Foundry Co.; 900, the Pullman Co.; 700, Haskell & Barker Car Co.; 250, Mount Vernon Car Mfg. Co.; 250, Pacific Car & Foundry Co. This is the first large car order placed by an individual railroad corporation since the inauguration of Government control, and it is expected that other lines will follow suit, particularly after the reversion of the roads to private management March 1. Numerous inquiries are now before the car manufacturers, but no definite action on them is expected until the return of the railroads is an accomplished fact. A few lines, it is true, have refused to wait for this event, notably the Union Pacific, just mentioned, and the Missouri, Kansas & Texas, which purchased 40 locomotives, as noted in THE IRON AGE of Jan. 29. The Chicago, Burlington & Quincy also has placed an order for five Mikado type locomotives with the Baldwin Locomotive Works. Inquiries for rolling stock now current include 40 chair cars and 25 baggage cars for the Union Pacific; 1000 ore cars for the Great Northern; 1000 gondola cars for the Illinois Central; and 35 locomotives for the Grand Trunk (Canadian lines).

New Use for the Dictating Machine

As an aid to scientific research the Ediphone bids fair to play a valuable part insofar as the dictation of descriptive data is concerned. It is suggested that the metallographist enlist the service of the Ediphone when he has occasion to observe the structure of a specimen under the microscope. His power of description is enhanced, while the field of vision is focused upon



Suggestion as to How the Dictating Machine May Be Used in Recording Observations in Studying Photomicrographs

the retina. Furthermore, he is in a position to vividly portray the image in its minutest detail.

The prevalent method of recording microscopic data in most research laboratories is to explore the specimen and then retire to the office and write a description of the details that remain fresh in mind. Much valuable information is lost in this manner; the investigator is often desirous of writing a more detailed report, but he finds it difficult to depict exactly what he saw.

It is true that photomicrographs are a valuable adjunct to scientific research, but their value may be enhanced by the phrases that describe them. Moreover, microstructures can be more clearly described under the microscope than on photographic paper. The scientist should find it to his advantage to dictate his observations the moment he sees them, and not rely upon the memory to give expression to his discovery.

Operations at the Krupp Plant

WASHINGTON, Feb. 4.—Information as to the present peace-time activity in the Krupp plant at Essen has been received by the Bureau of Foreign and Domestic Commerce from a person who visited it early in December.

"The plant is making no war munitions now," says the visitor. "The skilled workmen formerly occupied in the manufacture of arms and ammunition are being trained to turn out high-grade industrial machinery, such as auto gears, motors, high-position gears, milk separators, railroad locomotives, cars, etc. One of the foremen told the visitor that the Krupp factory plans to attain an output of at least one locomotive and perhaps 10 cars a day within six months from date.

"The former gun shop has been converted into a machine shop; the fuse shop to the making of all kinds of bolts and screws; and the gun-carriage shop to the making of Diesel motors.

"The most important work the visitor saw in point of magnitude seemed to be the repair of locomotives. He also saw them making steel car tires. Boiler plate was also being made with the machines formerly used in making armor plates.

"One of the Krupp superintendents stated that they were seeking to sell a great deal of extra machinery, lathes, etc., which had been installed during the emergency of war. It was also stated that during the war the area of land occupied by the plant was increased 70 per cent.

"Previous to the war (in 1914) 41,263 men were employed in the works at Essen, and 39,028 were employed at places outside of the main factory, making a total of 80,291 employees. During the war a total of about 171,000 laborers and mechanics were employed. At the present time the total number is reduced to 84,876, of whom 44,758 are employed in the factories.

"The workmen at the plant are reported as being fairly well satisfied with the wages and living conditions and they now work eight hours a day instead of 12 as during the war."

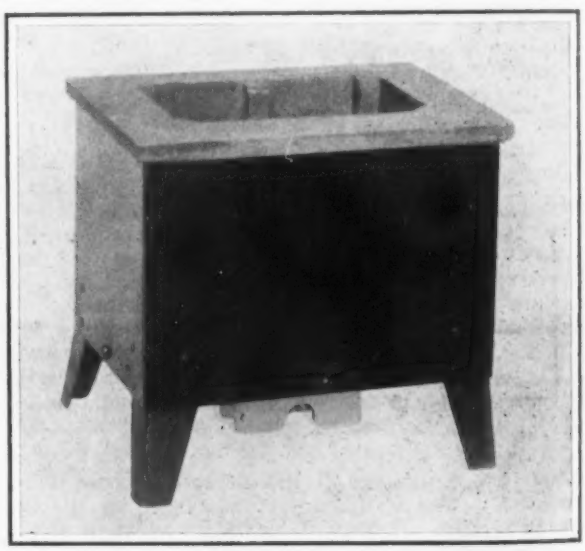
Metal Melting Pot Electrically Heated

A new electrically operated device for melting lead, babbitt and similar metals, has been developed by the General Electric Co., Schenectady, N. Y. It is known as the 25-lb. electric metal melter bench-type pot, and is designed to eliminate the loss of time and material, and risks of losses by fire, accidents, etc., which attend the melting of metals in haphazard containers, with a gasoline torch to supply the heat.

The pot has four short legs on the bottom and a flange on the upper rim, so that it may either be stood on a table or floor without fear of upsetting, or lowered into a hole so as to be flush with the top of the table. It is fitted with a plug and socket fixture that can be attached to the electric light circuit.

The heating element is a coil, wound around the container from top to bottom, and insulated from the outside, thus to insure an even distribution of heat and prevent temperature loss due to radiation.

The automatic regulation, which is the principal



Automatic Heat Regulation of This Pot for Melting Metals Is Obtained by the Use of a Coil with a Positive Temperature Coefficient

feature of the device, has been obtained by constructing the heating element of wire which has a positive temperature coefficient. When the temperature of the heating element rises its resistance rises proportionally, thus limiting the current and, consequently, the heat. When cold metal is put into the container the initial rise of current is enough to melt it quickly, but, after it is melted the current is automatically reduced to just enough to keep it molten, but not enough to burn it. This does away with the thick scum of oxidized metal around the top, which was a prominent feature of the old method.

Molybdenum in Commercial Alloy Steel

Effect on Physical Properties and Heat Treatment Temperature Range When Substituted for Portions of Nickel or Chromium

THE rôle of molybdenum in commercial alloy steels promises to be an important one, according to data contained in the advance pages of a 72-page book, "Molybdenum Commercial Steels," which the Climax Molybdenum Co., 61 Broadway, New York, has recently sent out. The book promises to be a most comprehensive one. It is replete with tables of tests, charts, photomicrographs and illustrations.

In its foreword the following statement appears:

All of the figures showing the physical and dynamic properties of the different molybdenum steels, all of the charts showing the characteristics developed by varying heat treatments and all of the statements as to their superior commercial value—contained in the following pages—have been approved in detail, before publication, by officials and metallurgists of some of the largest producers and consumers of alloy steels in this country. This book, is therefore nothing more than a compilation of facts (gathered from independent and unbiased sources) derived from actual experience with several score thousand tons of molybdenum steels, commercially produced and commercially used during the war and since.

Four prominent or major types of steels are discussed:

Chrome-molybdenum steel
Chrome-nickel-molybdenum steel
Chrome-vanadium-molybdenum steel
Nickel-molybdenum steel

In all of these steels, molybdenum is evidently substituted for a portion of the chromium or nickel usually present in these standard alloy steels. The claim is made that, by this substitution, the tensile strength is not only augmented but also the elastic ratio is strikingly increased. At the same time there is said to result a surprising increase in reduction of area. This increased reduction of area is pointed to as an index of the toughness and the machinability of the steel.

Another feature on which emphasis is placed is the widely increased range of temperatures within which the heat treatment of these alloy steels can be carried out and the uniformity of the properties of the resulting steels. Extracts from the data covering these claims are as follows:

The Four Major Types of Molybdenum Alloy Steels

Molybdenum on Chrome Steel

The addition of molybdenum to a chrome steel increases the elastic limit to a more marked degree than would the further addition of chromium, but with the most important difference that the brittleness is not only not increased but actually decreased, the greater toughness being shown by the higher elongation and reduction of area.

A chrome-carbon steel analyzing as indicated, properly heat treated to develop its best "balanced" properties, showed the following:

Carbon	Manganese	Chromium	Molybdenum
0.27	0.63	0.99	None (1 in. round)
Elastic Limit	**Tensile Strength**	**Elongation, Per Cent**	**Red. of Area, Per Cent**
130,000	139,000	16.5	58

Upon substitution of part of the chromium by molybdenum the steel developed the following properties:

Carbon	Manganese	Chromium	Molybdenum
0.26	0.64	0.76	0.31 (1 in. round)
Elastic Limit	**Tensile Strength**	**Elongation, Per Cent**	**Red. of Area, Per Cent**
142,000	151,000	18.5	62

Even where no higher physical properties are required or desired, the certainty of the results, the increased machinability and the other commercial shop practice economies materially outweigh the increased cost of the addition of molybdenum to the steel.

Molybdenum on Chrome-Nickel Steel

In making the Liberty motor crankshafts the average properties developed in the finished chrome-nickel steel shafts analyzing as shown were as follows:

Carbon	Manganese	Silicon	Chromium	Nickel	Molybdenum
0.35–0.45	0.50–0.80	0.10–0.20	0.70–0.90	1.75–2.25	None (on finished shaft)
Elastic Limit	**Tensile Strength**	**Elongation, Per Cent**	**Red. of Area, Per Cent**	**Izod Ft. Lb.**	**Brinell Hardness**
129,760	144,460	17.2	53.7	46	307

(Figures from a large American forging plant)

Tests on a higher grade chrome-nickel steel, made in connection with aircraft motor production during the war, averaged:

Carbon	Manganese	Silicon	Chromium	Nickel	Molybdenum
0.28–0.37	0.30–0.70	0.10–0.25	0.65–1.36	3.04–3.50	None (Rolled Bars 1" to 2")
Elastic Limit	**Tensile Strength**	**Elongation, Per Cent**	**Red. of Area, Per Cent**	**Izod Ft. Lb.**	**Brinell Hardness**
116,700	135,200	19.6	57.1	61	270

The molybdenum Liberty motor crankshafts showed the following average:

Carbon	Manganese	Silicon	Chromium	Nickel	Molybdenum
0.236–0.305	0.50–0.69	0.08–0.52	0.74–0.98	2.85–3.05	0.32–0.54 (on finished shaft)
Elastic Limit	**Tensile Strength**	**Elongation, Per Cent**	**Red. of Area, Per Cent**	**Izod Ft. Lb.**	**Brinell Hardness**
130,000	142,000	20.5	65	67	302

This chrome-nickel molybdenum steel was made by the United Alloy Steel Corporation, Canton, Ohio, for Liberty motor crankshafts and connecting rods, under the jurisdiction of the Aircraft Production Department of the United States Government.

These results on the chrome-nickel molybdenum steel, obtained on test pieces taken from the finished crankshaft, are the more remarkable when it is borne in mind that a drawing temperature from 1150 to 1200 deg. Fahr. is permissible. The high drawing temperature removes quenching and forging strains with the elimination of straightening operations during machining. Experience in making these finished Liberty motor shafts showed that the additional cost of the molybdenum was much more than offset by the savings brought about in the general shop practice. This is a matter of record.

Molybdenum on Chrome-Vanadium Steel

The steel which a large American producer of alloy steels is featuring will best serve to show the effect of molybdenum on a chrome steel containing vanadium, as well as the progressive effects of molybdenum in quantities up to 1 per cent. A chrome-vanadium steel analyzing as shown is capable of developing the following properties under suitable heat treatment:

Carbon	Manganese	Chromium	Vanadium	Molybdenum
0.32–0.40	0.40–0.60	0.80–1.00	over 0.16	None (1 in. round)
Elastic Limit	**Tensile Strength**	**Elongation, Per Cent**	**Red. of Area, Per Cent**	**Brinell Hardness**
146,500	167,500	16	54.5	340

The addition of molybdenum results in the following:

Carbon	Manganese	Chromium	Vanadium	Molybdenum
0.39	0.48	1.06	0.17	0.35 (1⅛ in. round)
Elastic Limit	**Tensile Strength**	**Elongation, Per Cent**	**Red. of Area, Per Cent**	**Brinell Hardness**
144,000*	155,000	23	63.5	310 to 330
170,000†	190,000	19	60.0	364 to 420

*Semi-Toughened †Toughened

These tests are furnished by the Crucible Steel Co. of America, Pittsburgh.

Molybdenum on Nickel Steel

The addition of molybdenum to nickel steels containing no chromium results in markedly increasing the elastic limit and the toughness and ductility for given elastic limits as measured by reduction of area and elongation. This effect is particularly pronounced when the steel is drawn at higher temperatures. The nickel-molybdenum steels are characterized by the greater ease with which finished products can be made therefrom; they can be heat treated without detriment to their physical properties in a wider temperature range and are exceptionally homogeneous and free from fiber and "flakes." The fact that in the manufacture of the Renault baby tanks, over 99½ per cent of the nickel-molybdenum steel parts passed all stages, including ballistic tests, while 76 per cent was the maximum in the case of the straight nickel steels, speaks for itself. Tests demonstrating these claims are furnished by courtesy of the Carbon Steel Co., Pittsburgh.

Heat Treatment

Molybdenum steels as a class are remarkable for the wide temperature range in which they can be heat treated without detriment to their physical properties. The following figures, selected from tests on commercial tonnages, will serve to illustrate this point:

Chrome-Molybdenum Steel

Carbon	Manganese	Chromium	Silicon	Molybdenum
0.23–0.30	0.50–0.80	0.80–1.10	0.10–0.20	0.25–0.40

(1¼ in. round)

Water Quench, Deg. Fahr.	Elastic Limit	Tensile Strength	Elongation, Per Cent	Red. of Area, Per Cent
1500	149,600	162,900	16.0	57.2
1550	151,000	163,400	16.5	57.3
1600	148,800	163,600	17.0	57.3
1650	148,500	161,400	16.5	58.9
1700	149,500	162,400	16.5	56.8

All drawn at 1000 deg. Fahr.

Chrome-Nickel-Molybdenum Steel

Carbon	Manganese	Nickel	Chromium	Molybdenum
0.25–0.35	0.50–0.80	2.75–3.25	0.70–1.00	0.30–0.50

(1 in. round)

Oil Quench Deg. Fahr.	Elastic Limit	Tensile Strength	Elongation, Per Cent	Red. of Area, Per Cent
1400	175,200	185,000	16.0	52.5
1450	179,300	187,400	15.5	51.5
1500	171,200	182,700	16.5	55.1
1550	174,200	185,100	16.0	52.8
1600	172,700	183,500	15.0	51.7

All drawn at 1000 deg. Fahr.

It will be noted that despite the extremely wide range in quenching temperatures the variation in physical properties is slight. Tests made within a quenching range of as much as 300 deg. Fahr. have also shown practically the same uniformity of results. The wide quenching range and permissibly higher drawing temperatures, with the decreased variations in properties for given temperature changes, mean less costly inspection and regulation; fewer rejections; hence, economy in heat treatment.

Molybdenum steels are less liable to warp during course of manufacture, due, in large part, to the depth hardening effect of molybdenum (which, among other things, permits the quenching of irregular sections with a minimum of warpage), and also as a result of the permissibly higher drawing temperatures which relieve quenching and forging strains. For given elastic limit values actual shop practice has shown that the molybdenum steels machine more easily.

Crankshaft and Spring Steel

Of the three grades of chrome-molybdenum steels the one of medium carbon content is probably the most important when considered purely from the standpoint of tonnage. It is a water-hardening forging steel used for airplane, automobile, truck and tractor parts such as crankshafts, connecting rods, steering knuckles, steering levers, front axles, etc., rear axle drive shafts, propeller shafts, either heat treated or cold drawn; automatic machinery parts, spindles, bolts, etc. Tests on approximately 4000 finished crankshafts forged from this type, showed the following average properties:

Carbon	Manganese	Chromium	Silicon	Molybdenum
0.25–0.32	0.71–0.76	0.45–1.04	0.11–0.22	0.32–0.46

(On finished crankshaft)

Elastic Limit	Tensile Strength	Elongation, Per Cent	Red of Area, Per Cent	Brinell Hardness
131,700	149,900	17.7	61.8	304

Considering all factors, physical and economic, entering into the manufacture of springs, several large producers have already gone on record as pronouncing this type the best commercial spring steel thus far developed. Its properties are as follows:

Molybdenum—0.25 to 0.40 per cent

Carbon	Manganese	Silicon	Chromium
0.40–0.50*	0.60–0.90	0.10–0.20	0.80–1.10

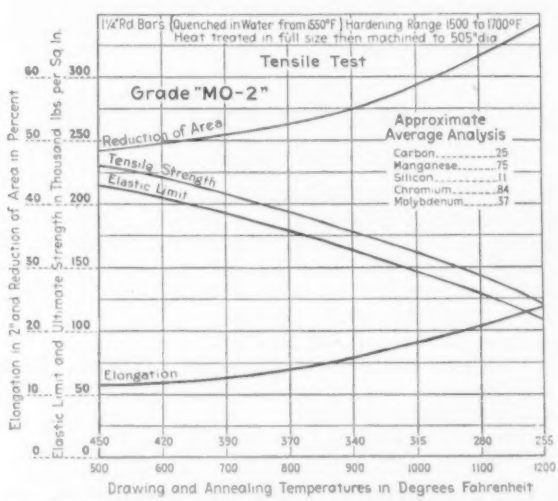
*Down to 0.35 for forgings. Up to 0.60 for rivet sets, etc.

Elastic Limit	Tensile Strength	Elongation, Per Cent	Red of Area, Per Cent
180,000 to 210,000	200,000 to 230,000	12 to 15	37 to 45

This steel is in use on the Fifth Avenue buses of New York. Gears made from this type of molybdenum steel combine a high degree of hardness and resistance to wear, with great strength and toughness. Less warpage, greater depth of penetration of the hardening and better machining qualities for given strength in the annealed condition, characterize this type of gear steel.

Use in Liberty Motors

The steel which stood out pre-eminently as one of the metallurgical achievements of the war was the chrome-nickel molybdenum steel, which toward the close of hostilities was playing an ever-increasing part in the successful quantity production of the Liberty motor. Dynamic and physical properties coupled with exceptional machining qualities, characterize this


1¼"Rd Bars (Quenched in Water from 550°F.) Hardening Range 1500 to 1700°F
Heat treated in full size then machined to .505"dia
Tensile Test
Grade "MO-2"
Approximate Average Analysis
Carbon .25
Manganese .75
Silicon .11
Chromium .84
Molybdenum .37
Reduction of Area
Tensile Strength
Elastic Limit
Elongation
Elongation in 2" and Reduction of Area in Percent
Elastic Limit and Ultimate Strength in Thousand lbs. per Sq. In.
Brinell
Drawing and Annealing Temperatures in Degrees Fahrenheit

The Relative Properties of a Chrome-Molybdenum Steel at Various Temperatures and Heat-Treatment Conditions

product. The practical elimination of straightening operations during manufacture, due to minimum warpage, the permissible cutting speed during machining, the wide temperature range allowable in heat treatment, the uniformity of the results, the fine "finish" developed and the smaller effect of section, are some of the reasons for the adoption of this type of steel in the industries of peace.

The actual results on the finished Liberty motor crankshafts, as furnished by the courtesy of the United Alloy Steel Corporation, Canton, Ohio, averaged as follows:

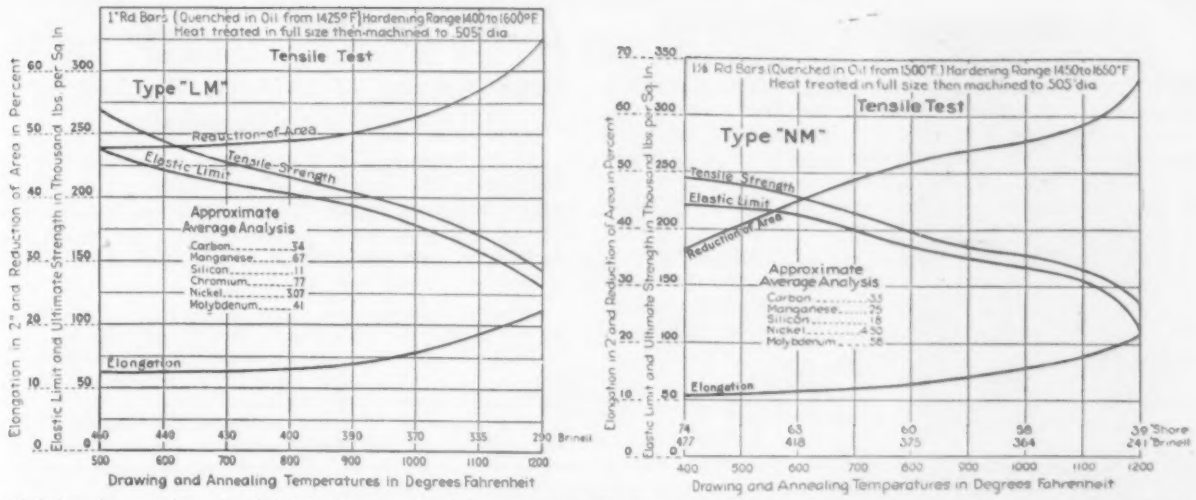
C.	Mn.	Si.	Cr.	Ni.	Mo.
0.305	0.69	0.52	0.98	3.05	0.54
0.236	0.50	0.08	0.74	2.85	0.32

Elastic Limit	Ultimate Strength	Elongation, Per Cent	Red. of Area, Per Cent	Izod	Brinell
130,000	142,000	20.5	65.0	67	303

The crankshafts were treated as follows: Forged and then twisted through the required angle; shaft is then annealed at 1600-1650 deg. Fahr. to relieve strains. Time at heat is about 1½ hr. Cooled in air. Heated in an electric furnace to 1475 deg. Fahr., held ½ hr. and quenched in water. Drawn at 1150 for 2 hr. Cooled in air and straightened before the temperature has reached 800 deg. Fahr.

Renault Baby Tanks

When the success of the Renault baby type of tank was assured and it was decided to produce a large number of them in the United States, the American steel manufacturer who was to furnish the fabricated armor,



The Relative Properties of a Nickel-Chrome-Molybdenum Steel (Left) and a Nickel-Molybdenum Steel at Various Temperatures and Heat-Treatment Conditions

developed and submitted a turret and gun protector of flanged and formed armor plates ranging in thickness from 0.25 in. to 0.62½ in., which would afford ample protection to men and guns and would greatly reduce the weight and increase the space available to the operator.

The French engineers were pleased with this idea, but refused to believe it possible to form armor plate into the intricate shapes required, until a French commission had visited the manufacturer and had seen the parts produced in large quantities and on a commercial basis. This was perhaps the most notable development in the manufacture of light armor during the period of the war.

This achievement was made possible by the use of nickel-molybdenum steel, which will be found equally effective in airplane, automobile, truck and tractor parts and all parts subjected to live loads.

Furnace Practice

Molybdenum, in the form of the ferroalloy, may be introduced into steel by any of the customary methods. Recent developments have shown that molybdenum may also be introduced into steel in the form of calcium molybdate, with equal efficiency. This statement is based on the results of many commercial tests in open-hearth and electric furnaces, made at both Government and private plants.

Already one of the foremost automotive engineers in this country, whose experience has primarily been with quantity production, is starting to build an all molybdenum steel car. Others are adopting molybdenum steels for vital parts.

Commercial Supply

While molybdenum bearing ores are found widely distributed, the metal up to relatively few years ago was classed as semi-rare or semi-precious, as no deposits of real commercial magnitude had been discovered.

A few years ago the Climax Molybdenum Co. acquired possession of a deposit of molybdenum sulphide at Climax, Col. This ore body, by far the largest known, is of such extent and magnitude as to make molybdenum commercially available on a scale sufficient to meet all requirements of the steel trade. The flotation mill, at Climax, to treat the crude ore, has at present a capacity of 1000 tons a day, and at this rate of production the ore reserves already developed insure steady operation for more than 30 years.

Otis Steel Co.'s Sheet Mill

The Otis Steel Co., Cleveland, will build a sheet mill plant adjoining its present Riverside Works. This will be an 8-mill plant designed for the manufacture of all kinds of steel sheets. Details have not yet been completely worked out, but inquiries for equipment are being sent out and contracts will be placed as soon as possible. The company's present Riverside Works includes a 72-in. plate mill and a jobbing mill plant consisting of three mills and two stands of cold rolls. The product of this plant consists of sheared plates and light plates and sheets from ¼ in. down to and including No. 18 gage in all standard finishes.

Large Westinghouse Addition

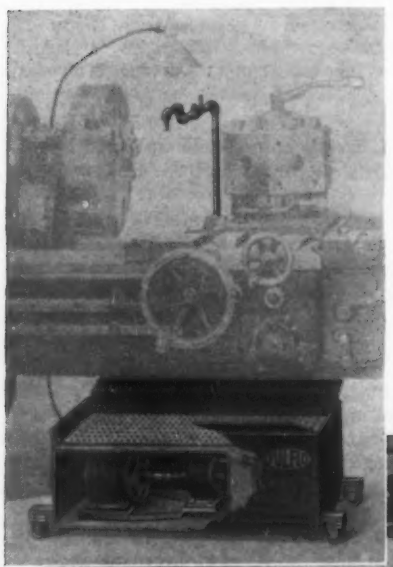
An addition at a cost of $5,000,000 will be made by the Westinghouse Electric & Mfg. Co. at its new Lester plant near Philadelphia. The company has started foundations for four new buildings to be added to the present group of seven new ones at Lester. The cost of the new buildings and equipment is estimated at about $5,000,000. Contracts for the building have been awarded to Westinghouse, Church, Kerr & Co., Inc., and will consist of a machine shop for large work, to measure 130 x 750 ft., and to include a balcony. It will be a duplicate of machine shop No. 1 and will be known as machine shop No. 3, an addition to the erecting shop to measure 130 x 300 ft., with balcony, a warehouse 40 x 600 ft., to be three stories, the upper floor to be used for light machine work, and a light machine shop, one story, 130 x 500 ft. At present the Westinghouse company has seven buildings at its Essington works, as follows: Foundry, pattern storage building, forge shop, power house, machine shop No. 1, machine shop No. 2 and erecting shop. It is expected the buildings will be constructed, equipped and ready for occupancy by July 15, next. At present 3,000 men are employed at the Lester works, and when the four new buildings are completed, work will be provided for 1,000 more. In connection with housing the employees, the company owns 200 houses, located close to the plant.

The Iron Trade Products Co., Pittsburgh, has increased its capital to $200,000 to take care of its growing business. W. J. Strassburger remains president, with the following elected to places as stated: J. L. Hukill, vice-president; L. J. Adler, treasurer; E. M. Moreland, sales manager steel department; C. E. Kitchen, sales manager coal department. Mr. Moreland has been connected with the Carnegie Steel Co. for the past 15 years, resigning his position as assistant to W. P. Siebert, assistant general manager of sales, to go to the Iron Trade Products Co.

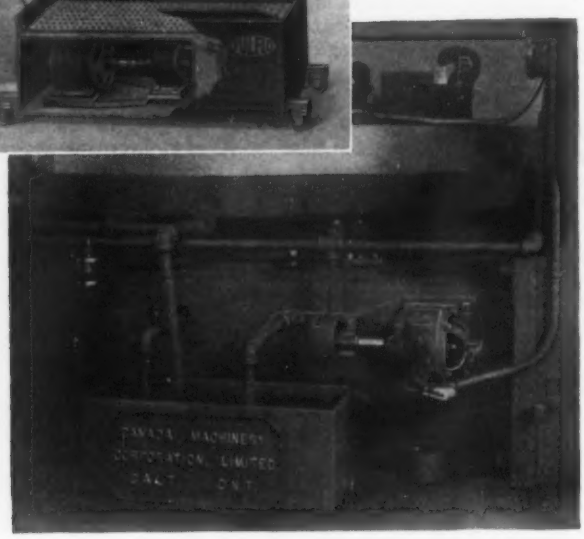
Production will commence in February in a new building erected by the Supreme Motors Corporation, Warren, Ohio. The company has orders aggregating two and a quarter millions and contemplates further additions during the year.

Portable Lubricating Pump Unit

One of the accompanying illustrations shows the general design and one of the applications of a portable motor drive pump unit made by the Fulflo Pump Co., Blanchester, Ohio. This unit, it is explained, has been designed to fill the demand for a complete, compact and inexpensive cutting tool lubrication system that can be quickly wheeled up to any machine tool in the shop and immediately start supplying the coolant to the cutting tool. Many machines are not equipped with a pan and pump because they are used mostly for working on gray iron, but occasionally are used on malleable, steel or some hard materials where coolant is vitally necessary for best results. It is for such occasions that the portable unit is applicable. It is also available as an emergency unit on machines having



Tools Ordinarily Used for Machining Gray-Iron Castings May Be Quickly Equipped for Work on Malleable Castings by Wheeling This Portable Lubricating System into Position to Supply Coolant for the Cutting Tool



individual coolant systems but with the pump or other part of the system out of commission.

It is a complete, self-contained system, requiring only the attaching of a motor cord to the lamp socket. The total height from the floor is 14 in., which usually permits of its being rolled under the lathe as shown. Provision is made for attaching additional splash boards when required. The pump and motor are completely covered, thus to afford protection from both liquid and dust. The outfit can be used on grinding machines, as well as on lathes, milling machines, drill presses, gear cutters, etc., as the pump, it is stated, is not affected by emery dust, grit or chips.

The other illustration shows the same pump, motor and base installed on a machine as a permanent installation where the portable outfit is not required, since the machine is provided with its own drainage and pan system. The pump has all the "Fulflo" features, such as holding its prime without the use of check valves, foot valves, or other mechanical appliances. No relief valves are required and the pump, it is stated, cannot clog as there are no passages in the pump smaller than the intake and outlet. The impeller is the only moving part in the pump and touches nothing but the liquid, thus to insure long life.

MINERS' CLAIMS

Large Amount of Evidence Received by the President's Commission

WASHINGTON, Feb. 3.—A large amount of evidence relating to the demands of coal miners for increased wages has been taken by the President's Commission during the past week. Summarized, the chief points made by representatives of the United Mine Workers of America were the following:

All wage increases which the miners have received during the war period, including the 14 per cent. increase fixed in the Indianapolis agreement, do not equal the increase in the cost of living and the present wage of the miners is even more inadequate than the pre-war wage.

The miners did not receive an adequate wage prior to the war and an increase proportionate to the increased cost of living would not place them on a just economic basis today and would be unacceptable.

Increases of miners' wages have not kept pace with wage increases in other industries.

Punitive overtime wage rates will tend to insure more strict observance of the standard work day and the opportunity for more uniform employment.

Increases in the cost of coal to the consumer have not been due to increased labor costs growing out of wage advances allowed the miners, but have been caused by excessive profits demanded and taken by the operators and the wholesale and retail coal dealers.

Earnings and profits of the operators have been grossly out of proportion to the increased cost of production, and the operators have not absorbed the 14 per cent wage increase fixed in the Indianapolis agreement, but, instead, have passed it on to the public.

Earnings of mine workers have been overstated and misrepresented by operators who have cited exceptional cases, and the commission should require the operators to produce complete and uniform payroll information covering the years 1914 to 1919.

One of the spokesmen for the operators was Don Rose, a Pittsburgh attorney. Mr. Rose declared that there is no justification for putting upon the public an extra burden of expense which would result from the granting of the miners' demands.

"We cannot believe that the miners' organization seriously advocates a 6-hour day with a 5-day week," said Mr. Rose. "It is an un-American proposition. If it is good for the miner, it is good for the man in other walks of life. The clerk who works in a dingy office, over a desk, with artificial light, is in more need of a 6-hour day than the man who toils. We do not believe the miner is sincere in this demand. We believe that he does not hope for a 6-hour day unless there is coupled with it time and a half for overtime, in which he will work eight or ten hours, as the case may be, and thus convert the grant of the demand into a wage increase. The inconsistency of the two demands, insofar as workdays are concerned, is self-evident. The demand that double-shift of work on coal for commercial tonnage is a direct attempt to limit production. We submit that the demands for a 60 per cent increase, if granted, together with the 6-hour day and 5-day week and time and a half for overtime, would put a price upon the cost of coal that would stagger even the American people; that it would create of the miner a favored class, enjoying a wage and working conditions and hours of leisure far above any other class of American labor."

Coal Lands Sold

UNIONTOWN, PA., Feb. 4.—Coal deals for an aggregate consideration of $550,000 were recorded here last week, involving the transfer of 320 acres of coal in the Lower Connellsville region. For $454,000 the Republic Connellsville Coke Co. sold 210 acres to the Connellsville Central Coke Co. and the Consolidated Coke Co. sold 110 acres to J. H. Hillman, Jr. for $99,000.

The Engineers' Club in the Youngstown district formally opened its new quarters on the third floor of the Park Theater Building, Youngstown, Ohio, with a housewarming, Jan. 27.

New Steel Plant in Argentina

Pedro Vasena e Hijos, Importers of Steel Products, Start Open Hearth Steel Foundry and Bar and Shape Mills

BY HARRY WRIGHT*

ALFREDO VASENA

THE first open hearth steel plant in South America has begun operations. It is the property of the Argentine Iron & Steel Works, in which Pedro Vasena e Hijos are largely interested. This firm is the largest engaged in the steel business south of the Rio Grande, its annual business running into millions of dollars; a large part of its trade is carried on with the United States. In 1918 this firm imported from the United States materials valued at more than $15,000,000 in American currency.

The business of the Argentine Iron & Steel Works was started by Senor Don Pedro Vasena in a small way in 1870. On Feb. 29, 1912, the Argentine Iron & Steel Works, Ltd., was formed into an English corporation with a capital of £1,000,000, a considerable part of which is held by English capitalists.

The business of the company has been steel fabricating and erecting, manufacture of bolts, nuts, rivets and wood screws. The company maintains a technical staff for building construction under the direction of an American structural engineer and has a complete plant for production of bolts, nuts and screws. It also has the largest wire drawing mill in South America, importing wire rods. The wire produced is mostly manufactured into mattress springs, fruit baskets and wire nails. The nail department turns out more nails than any plant in South America.

The Argentine Iron & Steel Works has erected some of the largest buildings in Buenos Aires, including the Chamber of Commerce Building, which used 3200 tons of steel and was erected in 110 days. It has also constructed several large refrigerating plants in Argentina and manufactures special refrigerating equipment and wool washing machinery.

The company's iron foundry and machine shops are well designed and compare favorably with similar plants elsewhere. A department devoted to the manufacture of patent steel chain is interesting as some of the machines are of the company's own design and manufacture. This department has a daily output of 15 tons of patent chain.

The principal plant of the company occupies two city blocks. The new open hearth steel plant and rolling mill is situated on a large tract of land on the Rio Chuelo, having ample railroad and wharf facilities.

While the company is largely English owned, Don Humberto Vasena, assistant general manager and technical director, and Percy Melville Simpson, secretary, recently spent about a year in the United States, selecting and purchasing the equipment for the new open hearth plant and rolling mill. This equipment was purchased by the Consolidated Rolling Mills & Foundries Co., 25 Broad Street, New York, which, in addition to the purchasing, superintended engineering details.

The new buildings have been fabricated and erected by the company itself and consist of open hearth, rolling mill and steel foundry buildings, each 350 ft. long, and containing three bays of 60 ft. width, each bay being served by a 10-ton crane. The plant is so designed that it can be added to from time to time. The first installation was a 20-ton open hearth furnace, with charging machine, and served by a 25-ton crane, supplied by Manning, Maxwell & Moore, New York.

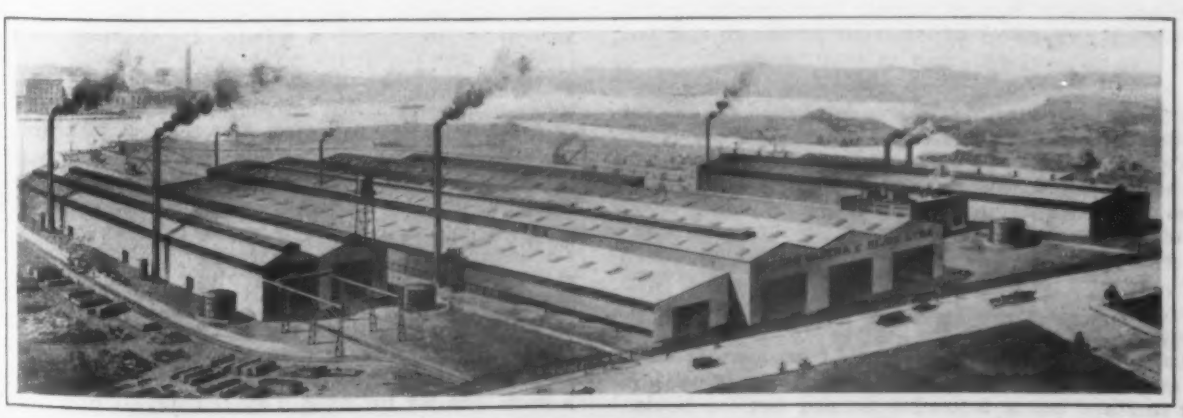
The plant is so designed that steel castings and ingots can be poured from the same ladle, one end of the building being arranged for the handling of castings and the other for ingots. The ingots are poured from the bottom, using the circular form of center pouring, pouring 24 ingots from each center ingot. The ingots will be about 7 by 7 in. by 4 ft. 6 in. and weigh about 740 lb. each, so as not to be too heavy to be handled by the rolling mill.

The mill equipment consists of a two-stand 18-in. mill, which will be used for breaking down and finishing the larger sizes, a five-stand 12-in. mill and a three-stand 8-in. mill, electrically driven. These mills were built by the Lewis Foundry & Machine Co., Pittsburgh. Two re-heating furnaces for the re-heating of the ingots have been installed, these being furnished by the W. S. Rockwell Co., New York. The plant is also equipped with the necessary shears, straightening rolls, pumps, roll lathes, etc., all American equipment. Waste heat boilers will be used on furnaces wherever it is practical.

The mills are designed to finish beams and channels from 3 in. to 7 in.; angles 4 x 4 in. to ¾ x ¾ in.; tees up to 3 x 3 in.; flats from 7 in. down, and rounds and squares from 3 in. down. A Corliss cross compound engine, 26 x 42 x 48 will serve to drive the mills, driving the 18-in. mill direct, and rope driving the 12-in. mill. The roll equipment was designed and furnished by the Pittsburgh Rolls Corporation, Pittsburgh. Two 500-hp. and one 250-hp. water tube boilers supplied by the Casey-Hedges Co., will be fired by fuel oil. The Argentine Republic supplies this fuel oil from the Rivadavia oil fields.

Pig iron will be imported. Scrap, limestone, fuel

*President Consolidated Rolling Mills & Foundries Co., New York.



New Plant of the Pedro Vasena e Hijos, Ltd., in Argentina

oil and other needed raw materials are plentiful in Argentina. The plant is so designed that it will be possible to manufacture a diversity of products.

The director-general of the company, Senor Don Alfredo Vasena, a son of the founder of the company, is frequently referred to as the "steel king" of South America. It is largely due to his untiring energy and ability that the plant has assumed its large proportions. The technical head and assistant director of the business, Senor Don Humberto Vasena, also a son of the founder, is an engineer of great ability and experience. The superintendent of the plant at Rio Chuelo is Senor Don Emilio Vasena. The secretary, Percy Melville Simpson, an Englishman, is well known to everyone in the steel trade in South America. Construction of the new plant is under the supervision of L. F. Uthe, an American engineer. Employees of the company number about 4000, many of whom are Japanese.

The market for steel products in the Argentine Republic is indicated by the figures from the Government's statistical reports, which show importations of raw materials, including pig iron, valued at $24,149,251 (American currency) in 1913 and $18,515,295 in 1914, while importations of finished steel products were valued at $25,891,054 in 1913 and at $16,642,817 in 1914.

Fuel Economy in Cupola Practice

Recommendations of British Committee for Improving Melting Operations—Experimental Results

FOR maximum efficiency in cupola practice the committee on behalf of the British Association Fuel Economy Committee has reviewed the details of design bearing most directly on the effective use of coke. In a paper submitted to the meeting of the Iron and Steel Institute at London, last September, by H. James Yates, vice-chairman, particular consideration was given to the factors making for a proper melting of the iron and fluxing of the impurities and for providing the necessary extra heat in the iron to keep it sufficiently fluid to make proper castings under actual shop conditions.

Tuyere Dimension and Location

Evidence was analyzed as showing that sufficient area of tuyere must be provided and that as long as the ratio of tuyere-area to the cupola-area is kept about a certain figure results obtained with one or more rows of tuyeres one above another yield no advantage in the ordinary way provided at least four to six tuyeres are used. The advantage of more than one row was believed to be simply that in case the capacity of the cupola should be increased by reducing the thickness of lining, the necessary increased supply of air can be provided for the heavier output.

As regards the furnace shape, no choice was found between those with equal diameter from base plate to charging door, over those with smaller diameter from base plate to above the tuyeres. The latter was considered better design for large cupolas for the reason that the coke bed is smaller, the blast enabled to get more easily to the center and the hot gases ascending from the combustion zone better distributed in the furnace and less likely to make their way up the sides of the charge.

The correct weight of charge should be ascertained by experiment for the most economical working. Longer blows are recommended as less wasteful than shorter ones. The coke charges should be regulated so as to bring the bed to its former level after melting the previous charge. It is suggested that attempts should be made to reduce the coke charge until the best results are obtained, so as to avoid waste fuel and slowing up of the feed and regularity of melting.

Kindling Tuyeres

The use of kindling tuyeres is advised for the four following distinct advantages:

1. Hotter iron is obtained at the beginning owing to its having to pass through a deeper bed of glowing hot coke. When the kindling tuyere is used properly, all the coke from the bottom up to the melting zone is at white melting heat. The iron on passing through this gathers heat all the way down on its progress to the tapping-hole. On account of the clean condition of the cupola at this stage the iron is probably hotter than any which may be run at any later stage during the day.

2. The iron being hotter from the first gives cleaner and better tapping-holes and removes the risk of iron solidifying in them. The condition known in the trade as at "iron hole" is much dreaded by the furnaceman. The iron plugs formed in the holes have to be driven out, and in doing this the clay may be cracked and broken, and the holes made too large.

3. When the ordinary tuyeres are put to work they start blowing on coke heated to a very high temperature, and are not so likely to blow cold and form the long snouts or projections which so often give trouble by preventing the coke from getting near the tuyeres, a condition which invariably results in bridging and the production of cold iron.

4. The bottom and sides of the cupola, as well as the coke bed, are so thoroughly heated that the danger of producing white hard iron is completely removed. A nice gray soft iron, easily filed and machined, can be run at the first as well as at any time of the cast, if this method is applied.

The committee advised reducing the blast pressure and the charge of coke when near the end of the blow in order to save coke and linings.

To make good the heat losses from the casing by radiation, sensible heat in the waste gases and undeveloped heat in the unburned carbonic oxide, it was suggested that it would be found advantageous to build wide cupolas so long as blast penetration was not jeopardized. The descending charge should be caused to take up as much of the heat of the gases leaving the combustion zone as possible. For this reason a high and narrow cupola is preferable, and with the introduction of lifts to handle the charge this can be easily attended to.

To keep at a minimum the lost, undeveloped heat due to unburned carbonic oxide, the usual causes, lack of adequate blast, badly arranged charges, or irregularities in the lining which upset the proper settling of the charge, and improper distribution of the air at the tuyeres, should be closely controlled.

Experimental Cupola Test

The particulars are given by the committee of results obtained with a furnace over a period of fifteen years. At the start (1901) the average output was given as 7.5 tons per hr. with a consumption of 286½ lb. coke per ton. This fuel charge was gradually reduced until in 1912 the output was 10.8 tons per hr. for a consumption of 191 lb. Later the diameter at the charging door and at the tuyeres was increased, as well as the tuyere-area, and an output was secured of 14.3 tons per hr. with a coke consumption of 212 lb. per ton of iron. This was subsequently improved by reducing the rate to 12.8 tons per hr., giving a coke consumption of 200 lb. per ton. The foregoing figures apply exclusively to cupolas engaged on light castings mainly from ⅛ in. to 5/16 in. thick. These figures, it is emphasized, indicate that there is a correct rate at which each particular cupola gives its most efficient operation.

As to heavy castings, regular figures are more difficult to get for the reason that foundries on heavy work also make light castings. In general, consumption of coke per ton of iron melted varies from 168 lb. to 420 lb., averaging 224 lb. per ton of iron.

Industrial Relations

Simplicity a Requisite

Short Talks on Vital Questions by One of Experience

This is the second of a series of articles on Industrial Relations by Thomas Stanion, director of safety, Aluminum Manufacturers, Inc., Cleveland, formerly the Aluminum Castings Co. Other chapters will discuss important problems which are constantly arising.

It's as old as the hills—this question of the working relation between the worker and the "big boss;" the one who receives a wage for his efforts that are clearly mapped out for him, and the other who supplies the work, decides how it shall be done, and has the payroll ready. The problem of their relation is old. It has been present since industrial management started when the first man hired another to work for him. But it was a simple problem then and was solved without a realization of its true magnitude. The worker was so close to his manager that he saw, understood, and appreciated the problems of management. The worker did not dictate the how and why of the business when his manager called him to counsel. He knew what things were for him to decide and what belonged to his manager. He had an interest in the business, not financial, as we term it, but a real heart interest.

As industrial organizations grew larger, we gradually drifted far from this man-to-man relation, and, assisted by a plentiful supply of men to hire, arrived at a day when the workers in the factory were purchased like wood and coal and iron, and given no more consideration than those inanimate things. There was much work to be done. The division of labor suggested and required the employing of men in large numbers. It seemed to be the very nature of the system as it fastened itself on business that men's hands should be hired merely, while the co-operation of their heads and loyalty of their hearts were overlooked.

Could we somehow wave a magic wand and have our industrial world reappear in the form of earlier days with small shops and close contact of men and manager, present-day difficulties would—but I need go no farther. This desire, however, points us toward the solution, for so closely as we can approximate the contact and mutual interest of those earlier days, just so much nearer are we to the goal. True, the same methods will not be used. The plan to be used is a part of the problem—a simple part, although some, because of its importance, would draw up a vast machine. In fact, the larger and more cumbersome the means used, the more of a handicap is offered. The more there is to explain to men and management, the greater are the chances for misunderstandings on both sides. Simplicity is the keynote and prime requisite of any plan—worked out to suit the conditions of each business; a plan that can be understood by unschooled minds and in which will be seen the sincere effort of the management to acquire and maintain the good will of the workers—as earnestly desired and sought after through equally fair means as the much-coveted good will of its customers.

Let no one think that though this needs a simple scheme, it can be handled by anything but a thoroughly comprehensive policy with due consideration for and matched up in its true relation with the other problems of the company. For we are dealing with fair-minded men—plain citizens like the rest of us who want nothing more than their just due, but who will be quick to see through any scheme that does not give them fair play. Such a plan must voice the sincere desire of the company to give the employee an insight into the problem of management. True, this must be done gradually and begun in a small way until a background of mutual confidence has been established, when more intricate phases can be undertaken. Such will give the worker an interest in his work to enable him to understand its problems and the company's fair methods of dealing. At the same time, management will have an opportunity to learn the difficulties of the employee and to appreciate their importance to him. With this goal of better mutual understanding at stake, it is quite clear that simplicity of treatment will assist materially toward its attainment.

When the Osborn Mfg. Co., Cleveland, manufacturer of industrial brushes, brooms and foundry moulding machines, established a New York branch several years ago, it was unable to domicile the company in New York State under their original name, because of a previously organized New York corporation having the same name. It therefore incorporated at that time as the Cleveland Osborn Mfg. Co. Later the Ohio charter was amended to take the same name. Recently, however, it has acquired the charter of the New York corporation, styled the Osborn Mfg. Co., and has arranged to have the business restored to the former name—the Osborn Mfg. Co. In November, 1919, the capital stock of the company was increased to $2,000,000. The plant capacity was doubled. The company has experienced large increases in sales of brushes and foundry supplies, and moulding machines. The main office and factory are located at 5401 Hamilton Avenue, Cleveland. Branch offices and warehouses are also maintained in New York, Detroit, San Francisco, Milwaukee and Chicago.

President Edward L. Clark of the Newton Steel Co., which is erecting a sheet mill plant in Newton Falls, Trumbull county, announces installation of equipment is progressing so satisfactorily that it is expected the first steel will be produced early in March. Advantageous contracts covering requirements of high-grade sheet bar for a definite period have been entered into, against which sales of finished product have been made for a conservative tonnage on a basis which insures profitable operation. The management further states that its entire tonnage for 1920 has for some time been in demand and could readily be sold in advance, but that it is considered advisable to accept only a portion of this offered tonnage at this time.

Owing to a recent explosion in its powdered fuel department, the Trumbull Steel Co., Warren, Ohio, has awarded a contract to the Fuller Engineering Co., Allentown, Pa., for the remodeling of its powdered coal equipment. The present installation will be replaced by two 57-in. gear-driven mills and a 5½x42-in. indirect fired drier with connecting parts. A pumping system of the Fuller-Kinyon type will convey the powdered coal from the Fuller mills to the pulverized coal bins at the furnaces. Screw feeders and motors of the latest type will be attached to the bottoms of the hoppers for mixing the coal dust and air for the furnaces.

Industry's Need of Proper Labor Policy

As Necessary as Sales, Fiscal and Manufacturing Policies — Welfare Attitude Must Not Be Camouflage But Genuine

STRIKES and the threat of strikes, slack production at the time when all the world needs production, ill will engendered by agitators, resentment fanned by profiteering, a seething cauldron of muddle-headed thinking that grasps at all the isms and schemes in the hope of solving the problem by shirking the given responsibilities involved—these are the harvest we reap from our callow, careless sowing in the past years of our national youth, according to Dudley R. Kennedy and Richard M. Neustadt, industrial consultants, Real Estate Trust Building, Philadelphia, who have expressed their views in a monograph, from which the following are extracts:

Three Industrial Development Features in 50 Years

The incorporation of ownership, the functionalization of management and the organization of labor have been the outstanding features of industrial development in the last 50 years. From the defects in each we are now suffering, and though we may, with a good deal of justification, blame present crises on the philosophies of radicals, we know that the real fault "lies not in the stars, but in ourselves." The industrial mechanism has broken down somewhere.

The incorporation of capital has made the boss a company; the functionalization of management has made the approach between brain worker and machine worker a long, indirect and politically hedged process; the organization of labor has made for bargaining between armed camps. The employee has been driven far from the sources of supply of the material which he uses, and equally far from the final finished product of which his effort is but a small part. His work, his association with his employer, his relation to his fellow-workers is all mechanized.

Employee Ignorant of Business of Industry

The worker loses all contact with every phase of the business except the one highly specialized and highly monotonous task on which he is engaged. He hears about "overhead" and "costs" often enough, but only vaguely. But of the fundamental economics of business nothing is told him, and no attempt is made to arouse his intelligent interest in the relation of the major problems of finance, sales and production to his own earnings or their effect on his own living problems. The neglect of management to undertake all such education opens the way for outside ill-informed and basically unsound "friends of labor" to usurp the rôle of teachers. From them he hears much of profits—hears it until he believes it; believes it until he grows convinced that his employers are robbers. To a man in this frame of mind there is but one hope possible—revolt.

Industry is a co-operative enterprise involving the united effort of many factors—money, land, power, machinery and raw materials—and of many men. The success of any form of industry depends, therefore, on the character and quality of the leadership it develops. That factor of industry whose function it is to supply leadership is management. Management has displayed a wizardry of leadership in the control of material things, such as iron, coal, gold, water and electricity. But management has failed to display a similar grasp of fundamentals, a like vision of the possibilities involved, and a same sincerity of effort in the leadership of the human organization of our mechanized industry.

This is in the main due to the fact that labor hitherto has been the most easily available factor of business. Moreover, as long as there was still a real frontier there was still enough of the pioneer spirit to make of the worker a real individualist, content to put up with the poor conditions of to-day because of the confidence he possessed that to-morrow the gates of opportunity would be opened to him. The frontier still exists and the gates of opportunity are still at hand. But it becomes daily more difficult for the worker to believe it as he sees the frontiers closing and the march of the city, the factory, the tenemented home everywhere stabilized. His pioneer spirit extends itself now in group rather than in individualistic effort. Moreover, this trend toward group action gains in economic advantage as there appears a real labor shortage concurrently with a demand for universal production.

Each Industry Needs Definite Labor Policy

The labor policy must be the honest and publicly declared philosophy of the official directorate in light of all the facts and with all cards on the table. Any employer who introduces so-called industrial democracy in his plant without actually intending to share the control of his working conditions with his workers is not only wasting his time and money but is also strengthening radicalism. Whatever is done must be prompted by genuine sincerity of desire, genuine co-operativeness of effort, genuine honesty in seeking the goal. Unless this spirit is present the employer is playing with dynamite.

In the devising of a real labor policy, management must first know all the facts of the business; secondly, must establish a personal and non-political contact with its employees, and thirdly, must be conversant with the various methods that have been used in practice with good results elsewhere. To secure these it may be advisable for management to bring in an experienced outsider who can bring to the attention of the whole organization a freshness of viewpoint and a store of knowledge that has often become lost to those who are in such daily contact with the processes and with each other as to dim their sense of perspective. However, an outsider can no more solve the problem than can a doctor cure a patient. It remains primarily with management, preferably through the co-operation of the workers, to analyze the whole problem as it applies to their own conditions and to outline their own program in light of their own experience.

Interesting Wage Problems

Officers of the Amalgamated Association of Iron, Steel and Tin Workers will start figuring this month on the 1920-1921 wage scale, to be arbitrated at a conference with employers in June. Both manufacturers and workers are interested in extent of the wage demands which it is certain will be presented, in spite of the fact that employees in sheet and tinplate mills are the highest paid mechanics in any industry. A Youngstown district maker states that in 1919 several of the sheet rollers employed at his mill earned as much as the vice-president of the company. With the exception of the puddle and sheet departments of the Youngstown Sheet & Tube Co., all puddling, sheet and tinplate departments in the Mahoning Valley are now classed as union mills. The latest acquisition to the mills which operate under the sliding scale paid such workers is the Girard, Ohio, puddle mill of the A. M. Byers Co., Pittsburgh, one of the largest puddle mills under one roof in the country. The scale was accepted by the company during the steel strike, after its plant was forced into idleness with other district plants.

All Plants Affected

In spite of a clause in the agreement which the manufacturers have with the Amalgamated to prevent strikes during the life of the contract, all plants in the

Valley were adversely affected by the strike. Officials of the Amalgamated claimed their men were not on strike, but were prevented from working by the failure of unskilled men to report for duty. While large numbers of such employees were not affiliated with the Amalgamated or any other union when the present agreement with the mills became effective July 1, 1919, many subsequently joined during the organization campaign conducted by the American Federation of Labor. An essential provision of the Amalgamated agreement is that where men in other departments of the mill, such as unskilled laborers, become members of the union within the year for which the scale is adopted, the Amalgamated may present a scale covering the work done by the newly organized men, but if it is not accepted by the employer, there shall be no strike within the twelve months covered by the contract.

When the strike was called, however, these men walked out with other newly organized employees in other branches of the industry, thereby violating a part of the Amalgamated contract. This situation developed conflict between members of the national committee of the A. F. of L., which conducted the strike, and the Amalgamated, represented on the committee. In fact, it is claimed this controversy was one of the factors which caused the downfall of the strike. Manufacturers, however, did not hesitate to point out this clause, and in one case at least, the Trumbull Steel Co. at Warren, Ohio, officials of the Amalgamated were informed that unless this clause was observed the entire contract would be abrogated.

Attitude of the Amalgamated

It was this clause which broke the strike in every plant in the district with which the Amalgamated had a contract. M. F. Tighe, president of the Amalgamated Association, urged these men to return to work in spite of the fact that A. F. of L. organizers called them traitors and tried to keep them from going back.

When the new scale is being discussed the status of such men who returned to work on the promise that the Amalgamated would take care of their interests insofar as it is able, will be an interesting issue. Such men exist in all nine mills in the Mahoning Valley having contracts with the Amalgamated Association, including the DeForest works at Niles of the Republic Iron & Steel Co., the Haselton mill of the Sharon Steel Hoop Co., the Empire, Thomas and Western Reserve mills of the Brier Hill Steel Co., Trumbull and Liberty mills of the Trumbull Steel Co., plant of the A. M. Byers Co. at Girard and the mills of the Mahoning Valley Steel Co. at Niles. In addition, two new sheet mills in the Valley will be operating before the conference is held, the Falcon Steel Co., Niles, and the Newton Steel Co., Newton Falls, and both will be represented at the wage meeting.

The question of whether employees in the puddle and sheet departments of the Youngstown Sheet & Tube Co. will demand an agreement under Amalgamated rules is also being discussed. The scale of the Sheet & Tube company in such departments, it is pointed out, is equal to or higher than that of the Amalgamated. The company also has the representation plan and has frequently announced its determination not to deal with its employees through unions. It is certain no deviation would be made from this rule in the case of sheet and puddle mill workers.

The wage rate paid by the American Sheet & Tin Plate Co. is regarded as one of the determining factors in arranging a new scale with the independents by the Amalgamated Association. The bi-monthly settlement, however, for puddle, sheet and tin mills is based upon sales sheets of the various commodities, representatives of the manufacturers and the men meeting every two months and examining the sales prices.

In July, 1919, a slight increase was granted affecting employees as a result of the Atlantic City conference in June, but differentials of various kinds substantially reduced the actual advance. After the base rate was adopted July 1, there was no change of wages for either puddlers or sheet rollers until the January settlement, when the boiling rate increased.

Searching an Employee

Employers in Pennsylvania should uphold rulings of the State Industrial Board even to the point of "discharging an employee who will not voluntarily and in good faith submit to a search" when the board forbids the carrying of matches or other flame producing devices into places where ether is manufactured or handled, according to an opinion just given by the Attorney General's Department. The question was raised with Commissioner of Labor C. B. Connelley, by some employers whether they had the legal right to search an employee by the use of physical means and whether, if they employed force, it would not make them liable for arrest on charges of assault and battery. Deputy Attorney General Emerson Collins, who wrote the opinion, says that the ruling of the board requires a search and that dismissal of an employee carrying matches under such circumstances is a duty. "The remedy," he says, "in the case of an obdurate employee is not to attempt to enforce a search of his person against his will to ascertain whether he is carrying the interdicted articles, but at once to discharge him from employment if he withholds consent that it be made."

One Result of the Strike

Improved efficiency in operating organizations is one of the noticeable effects of the steel strike in the Mahoning Valley, Ohio. After the mills resumed many new men came into the district who rapidly learned their duties and in many cases displaced workers, especially older men, who, officials declare, had so regulated their duties as to turn out a specified output and no more. The withdrawal of this class has been beneficial to the mills. Not only did such men impair their own efficiency but discouraged others, particularly newcomers, from setting a better pace. Valley employers feel that labor disruptions will be rare in the Youngstown district during the next 12 months, many of the strikers still paying bills which accumulated during the period of the strike.

Anti-Picketing Injunction in California

The Union plant of the Bethlehem Shipbuilding Corporation, San Francisco, has obtained a temporary injunction restraining its striking boilermakers and machinists from picketing. Besides the two unions specified in the injunction, about 50 individuals were named. The corporation has been asking for an injunction for some time, and on its issuance Federal Judge Van Fleet stated that he had purposely delayed action in the matter as he knew that leaders on both sides had been doing everything possible to bring about an agreement. As all attempts at a settlement had proved futile, Judge Van Fleet said that it was necessary for the court to use its power to prevent destruction of property and interference with individuals who wished to work.

In the World of Labor

For the purpose of making a study of the relations between employer and employee and to bring about a better understanding between these two forces, and also to further Americanization, the Baltimore Industrial Conference was formed in Baltimore on Jan. 29. Henry F. Baker was made chairman. He called the meeting, which was attended by all classes. Mr. Baker said that conditions cannot continue as they are and some one will have to do something to bring about a change. He named a number of committee chairmen, each to appoint his own committee and make a study of conditions in his respective line and then make a written report to the conference.

The Allegheny Steel Co., whose plant is located at Brackenridge, Pa., is making an attempt to reduce the high cost of living of its employees, which number 2000, or more. Last week the company bought two carloads of groceries and about 10,000 pounds of sugar, all of which were placed on sale to its employees at actual cost to the company. Canned goods, ham, bacon

and other commodities were sold. Sugar was distributed in 25-lb. lots.

The failure of Congress to pass the naval deficiency bill will result in the lay-off of a large number of men at the Charlestown, Boston, navy yard, within the next month, according to official talk. Already quite a large number of men are idle as a result of the monthly appropriation being cut $50,000, and others are on furloughs. Many of the men in these two groups are seeking employment elsewhere.

Indicating the prosperity and saving propensity of foreigners employed in the steel industry is the growth of a bank at East Youngstown, Ohio, where large numbers of foreigners employed at the Youngstown Sheet & Tube Co., Republic Iron & Steel Co., Sharon Steel Hoop Co. and other nearby plants reside. At its first annual meeting, the institution showed resources of $661,630.52, which increased on Jan. 26 to $761,397.56. The bank began business April 21, 1919, with a paid-in capital of $200,000 and surplus of $20,000.

An annual dividend on wages of workers, averaged the same as stock dividends, was the New Year's gift of the Morse Chain Co., Ithaca, N. Y., to its 670 employees. The company has also established a fund to operate a service store in the new service building being erected. The building will contain a cafeteria as well as the store operated on a cost basis. Frank L. Morse, president of the company, in his message to the employees, said: "To the 'chain gang' one and all, the whole 670 of you, a Merry Christmas and a Happy New Year is the wish of the 'Old Man.'"

Pittsburgh Open Hearth Steel Co.

The Pittsburgh Open Hearth Steel Co., with offices in the House Building, Pittsburgh, was organized recently, and is composed of Washington, Pa., and Detroit capital. The new concern has bought a site of about 70 acres, located near Canonsburg, Pa., on which it proposes to put up a new plant to have a capacity of about 160 tons a day of universal and grooved rolled plates and hot-finished strip steel. The first unit of the new plant will consist of a main steel building 80 x 400 ft., equipped with one stand of 34-in. roughing mills, one stand of 24-in. duo mills with repeater, and one 22-in. two-high finishing mill. These mills will be equipped with an electric drive and a 2,000-h.p. motor will be installed, contract for which has not yet been placed. The plant will also contain three 20-ton gas producers, a 15-ton electric traveling crane, two heating furnaces, 29 ft., 6 in. x 9 ft. 6 in., with charging machine for charging slabs into these furnaces. The company will furnish its products either pickled and limed or pickled and oiled. Ground has been broken and work on the erection of the plant will be started soon, and it is expected to be ready for operation in four to six months. The officers are J. H. McCloy, president; A. S. McCloy, secretary, and H. J. Clowes, treasurer. The directors are M. W. McClane, Washington, Pa.; J. C. Griffin of the Griffin Mfg. Co., Erie, Pa.; G. W. Benton, Conneaut, Ohio; J. H. McCloy and H. J. Clowes.

The Empire Tube & Steel Corporation, College Point, N. Y., was recently organized and took over the tube mill portion of the Empire Art Metal Co., Inc., and it is its intent to specialize particularly in high grade welded steel tubing, which will be known as the "Titian" brand. The officials of the company are William C. Lange, president and general manager; John Fraser, vice-president and consulting engineer, and Edwin S. Morgan, secretary and treasurer. The company has met with marked success, particularly in the automotive fields, having several large contracts on hand.

The production of by-product coke in 1919 approximates 25,000,000 tons, according to estimates of the U. S. Geological Survey. This is about 1,000,000 tons less than the 1918 production. The estimated production of beehive coke last year is 19,650,000, against 30,481,000 in 1918. The by-product production figures 56 per cent of the total in 1919 and 46 per cent in 1918.

British Iron and Steel Exports in 1919

British exports of iron and steel in December were the highest for any month last year. The total, excluding iron ore and including scrap, was 233,811 gross tons. The best previous month was 214,632 tons in August; the lowest was 109,939 tons in February. The December increase over November was made largely of heavier gains in pig iron, tin plates and galvanized sheets.

The course by months in the exports for 1919 as compared with 1918 and 1913 is given by the following table:

British Steel Exports in Gross Tons

	1913	1918	1919
January	443,230	139,151	170,543
February	363,551	134,500	109,939
March	397,621	118,146	159,529
April	470,040	135,927	173,606
May	463,197	141,006	208,179
June	427,148	154,506	195,582
July	455,626	149,592	191,724
August	395,656	162,693	214,632
September	394,849	110,260	191,140
October	435,534	113,069	201,287
November	430,113	135,120	204,223
December	373,354	122,913	233,811
Total	5,049,919	1,616,883	2,454,195
Aver. per month	420,826	134,740	204,516

These figures show that the export rate has steadily increased as the year advanced until in the last quarter it was not far from half of the 1913 outgo which was the record year. In the last quarter of last year also the exports were nearly double those for the same period in 1918. In totals the 1919 outgo is just short of half the 1913 exports.

In certain finished steel products some marked gains were made in 1919 over 1913, whereas in others the recovery has been slow, as revealed by the following table, in gross tons:

	1913	1919
Steel plates	133,949	238,551
Steel bars	251,059	249,443
Steel rails	500,117	125,216
Galvanized sheets	762,244	186,101
Tin plates	494,921	289,761
Black sheets (under ⅛ in.)	68,111	133,312
Sheets not under ⅛ in.	132,989	238,591

Imports on iron and steel in December were 58,320 tons, which compare with the record of the year of 87,892 tons in October. For the year the 1919 imports, excluding iron ore and including scrap, were 618,692 tons, which compares with 342,522 tons in 1918 and 2,343,173 tons in 1913. The import monument has a long distance to go before it reaches the 1913 volume. In 1919 it was only about one-fourth the pre-war rate.

Of the 1919 imports 163,477 tons was pig iron as contrasted with 213,708 tons in 1913. In finished steel the imports last year were 343,091 tons as against about 2,000,000 tons in 1913, while in semi-finished steel there were 255,793 tons imported in 1919 and 833,000 tons in 1913.

Iron ore imports in 1919 were 5,202,707 tons as contrasted with 6,581,728 tons in 1918 and 7,442,249 tons in 1913.

Manganese ore receipts have been small also. In 1919 these imports were 265,800 tons while in 1913 they were 601,177 tons. In 1918 these imports were 365,606 tons.

Canadian Iron and Steel Output in 1918

The Canadian pig iron and steel output in 1918, according to final official data just issued, was as follows, as compared with 1917, in net tons:

	1917	1918
Pig iron from blast furnaces	1,156,789	1,163,520
Pig iron from electric furnaces	13,691	32,031
Steel ingots	1,691,291	1,800,171
Steel castings	54,443	73,537
Electric steel	50,467	119,130
Ferroalloys	43,465	44,704
Steel rails	46,645	162,747

Of the 1918 pig iron output, 966,409 tons was basic, 15,415 tons Bessemer and 181,696 foundry iron, the low phosphorus iron being all made from steel scrap in electric furnaces. The ferroalloy output was chiefly ferrosilicon, 50 per cent, but included also spiegeleisen, ferromolybdenum and ferrophosphorus, all made in electric furnaces except the spiegeleisen.

Foreign Machine Tool Conditions

WASHINGTON, Feb. 3.—Reports received by the Bureau of Foreign and Domestic Commerce state that machine tool dealers in Stockholm, who are agents for American firms as well as manufacturers of certain Swedish machines, complain of an embarrassing situation as regards their American principals. They seem to think that the American tool men are expecting too much from their Swedish representatives.

"There is no doubt," says one Swedish firm, "that the Germans are recovering control of the Swedish market for machine tools, lathes, turret lathes, milling machines, grinding machines, planers, boring and turning mills, slotters, radial drills, and also heavy machinery for shipbuilding yards and railways."

Summarizing the situation as shown by its reports, a statement by the bureau says:

"There are certain industries that still need machine tools, namely, the automobile men, who have changed their styles of cars, and must have new machine tools. Also, there are some large companies, now inactive, which are buying tools, not because they need them at the present time, but because they can be bought so cheaply from Germany; and their purchase is considered a good investment. One dealer has seen specifications from Swedish works for German tools and machines—one calling for 1,000,000 crowns' worth and one for 250,000 crowns (crown = $0.268). It is estimated that American machines of this kind would cost almost three times as much as the German.

"It is true that American machines enjoy a better reputation than the German and can ordinarily be sold 10 to 20 per cent higher for this reason; but when the difference is 200 to 300 per cent, there is absolutely no chance of selling them. Naturally a few American-patented machines can be marketed because there are no others to compete with them.

"A specific case is that of an American 54-in. vertical turret lathe. The American export price for dealers for this machine is about $6,500, and with freight, etc., costs in Sweden 33,000 crowns. An exact German copy of this machine is priced at 52,000 marks (mark = $0.238, normal value). This is not the lowest price the Germans can make, since they add from 40 to 50 per cent because the low value of the mark enables them to sell cheaper than other makers. (The mark is now worth about one cent). It is stated also that the Germans have been able to keep wages down; a recent traveler in Germany reports that wages for a good mechanic are only 20 to 23 marks a day."

German Prices of Brass and Copper Rolled Products

The minimum basis price of brass sheets is advanced to 25,250m. per ton and of brass rods to 18,000m. per ton. Copper sheets are advanced by 780m. to 28,480m. per ton. Zinc sheets have been increased by 750m. to 6500m. per ton. The Spelter Syndicate has advanced the price of raw spelter by 600m. to 5100m. per ton, but as practically no material can be obtained at that price—about 9000m. per ton being actually paid in the open market—it will be proposed to raise the official quotation further by at least 2000m. per ton.

To Extend Trade to Russia

WASHINGTON, Feb. 4.—A number of exporters of machinery participated in the organization of the American Commercial Association for the Promotion of Trade with Russia in Washington recently. E. P. Jennings of Lehighton, Pa., president of the Lehigh Machine Co., was elected temporary chairman and E. E. Pratt of E. E. Pratt & Co., New York, former chief of the Bureau of Foreign and Domestic Commerce, was made temporary secretary and treasurer. Among other companies represented at the meeting was Rahn Larmon & Co., manufacturers of machine tools. Several hundred million dollars' worth of capital was represented.

It is the purpose of the organization to bring pressure to bear upon the State Department for the removal of all restrictions upon trading with Russia. Failing in this effort, it is planned to bring mandamus proceedings. Another meeting will be held in New York on Friday.

French Commission Selecting Tools

WASHINGTON, Feb. 3—Members of the French commission who arrived last week in this country to make selections of machine tools from the War Department surplus, after spending a few days in Washington, have left for Cleveland to look at surplus in that territory. Members of the commission include M. Hedde, chief of the commission; M. Gouge, assistant chief; M. Drouzy, technician; and M. Albat, transportation expert. Members of the commission will remain in this country for several months making selections under the $25,000,000 contract arranged between the War Department and the French Government some time ago.

The Surplus Property Division of the office of the Quartermaster General of the Army, under the selling plan recently adopted, has prepared lists of surplus war material valued at approximately $30,000,000, which are being offered for sale each week by informal bids. Under this plan, no bid forms are necessary and no deposits are required. Offers may be submitted to the nearest zone supply officer or to the Surplus Property Division at Washington. Among the lists so far prepared is one on machinery and engineering material for which bids close on Feb. 17, and another on the same class of materials for which bids close on Feb. 24.

The Austrian Steel Market

In Austria the stocks of metals in the hands of the merchants are practically exhausted, but underhand dealings are rife, says the London *Ironmonger*. Nearly all the available iron products are being sent out of the country, mostly to Italy, the Balkans, Hungary and Jugo-Slavia. Sheets are scarcely obtainable, as the output is greatly hampered. The iron works are overwhelmed with orders, and only accept new contracts for delivery after a year or longer. Prices are still advancing at such short intervals that the manufacturing industries are unable to make any reliable calculations. Not long ago the Alpine Montan Co. quoted 2500 kronen per ton for bar iron; at the end of November the price had risen to 4600 kronen, and now it stands at 5000 kronen.

Locomotive Export Association Formed

The American Locomotive Co. and the Baldwin Locomotive Co. have formed the Locomotive Export Association, primarily to handle the recent order of the Belgian Government for 150 locomotives which was divided between the two companies. To work in conjunction on this order, it was necessary under the Webb-Pomerene act to form this association. As yet, the new organization has no officers, its management being vested in two representatives of each company. Although formed for the purpose of executing the Belgian order, the association will probably be continued to handle other foreign business and may become the nucleus for a large export organization to include the American Car & Foundry Co. and others.

Exporter Opens Two Foreign Offices

Victor E. Karminski & Co., Inc., 295 Broadway, New York, exporter of iron and steel, has opened branch offices in London, 3 St. James Place and Swansea, South Wales, Eagle Chambers, Adelaide Street. G. A. Stevenson, an American identified with the steel business in England for a number of years, has been appointed to open these branches. Mr. Stevenson was formerly connected with Richard Thomas & Co., manufacturers of tin plate, Llanelly, South Wales and later was with the Pemberton Tinplate Co., Llanelly, and the Asiatic Petroleum Co. of London. His father, Edwin Stevenson, was the first man to produce tin plate in the United States. He imported black plates and tinned them in Elizabethport, N. J., later moving his plant to Gas City.

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The Wage Advance and Prices

Whether the decision to increase wages, unexpectedly announced January 30 by the United States Steel Corporation, was occasioned by local competition for labor, because of some higher hourly wage rate offered for like service, or whether it is an acknowledgment of a need to prevent further exodus from steel plants and instead to secure a return movement of workers to increase production,—whatever the reason, buyers find the first question one respecting a possible advance in prices for the Corporation. The official reply is that there is no present intention to make any advance.

It is difficult to see how an advance at this time by the Steel Corporation would avail of anything in meeting the increased outgo on the wage account. It is to be remembered that on many products the Corporation has bookings equivalent to substantially nine months production. Had it wished to raise prices, it would not have been necessary to make a wage advance first. The conspicuous fact in the steel market for some months has been the position steadfastly held by the Steel Corporation, following the assertion of Judge Gary, made at the time of the collapse of the Industrial Board's scheme to establish maximum prices, that the prices then offered as fair to the railroads and other buyers would be maintained for all the rest of the year. The so-called March 21 prices are already in effect far into 1920. A number of other leaders of the steel trade took the same stand of doing what was possible to resist the upward climb of prices and have helped materially in putting the brake on the merry-go-round of alternate jumps in wage and material costs.

The necessity of absorbing increasing costs in the different steps in manufacture, over which the less integrated companies have little or no control, has made it very difficult to stem the rising tide of these costs on top of buying pressure. Latterly such makers have given way in the face of still higher material costs in the immediate future, instanced by higher ore prices, higher freight charges and therefore higher coal, limestone and the like, and now the definite higher labor cost which they must all meet.

It is not known how far through the organization wages and salary readjustments will be made and it is difficult to ascertain what the total increased labor cost will be. If it is assumed that the increase amounts to as much as $1.50 per ton of finished steel, then the Steel Corporation's wages account will be increased about $20,000,000, and if the cost should amount to about $2 per ton, the total outgo will approximate $28,000,000. As the Corporation on the basis of the quarterly statements for 1919 had a surplus of 5 per cent on the common stock after paying 5 per cent common stock dividends and the proposed wage advance amounts to 4 to 5½ per cent, the wage advance is substantially equivalent to the 1919 surplus. The showing would indicate then that there is no great necessity of increasing prices to maintain disbursements to stockholders. Even the old surplus might remain intact, while conditions may so materially change that much of the bookings of the Corporation for the latter part of the year might be made at considerably higher prices. A quarter of its output shipped at the same price as prevailed in the first weeks of 1919 would increase the income close to $2 more per ton spread over the year's output. Then would a safe surplus over dividend requirements be also the record of 1920.

The Advance in Ore Prices

The advance in the price of Lake Superior ore of $1 per ton puts the price for old range Bessemer on a basis of $7.45, bringing the quotation to the highest on record, dating back to 1890. The advance is also the largest in many years, with the exception of that of 1917, which was $1.50, and that of 1896, which was $1.40. But the advance is neither surprising nor unreasonable, for wages of the miners have advanced steadily, and some of the deep mines have had difficulty in making ends meet. The Lake Superior region has been free from serious labor trouble, but there has been some scarcity of labor and it is not expected that the mines will be able to produce more than will be required for the present season; in fact, it is predicted in some quarters that owing to the tremendous demand expected there is likely to be a shortage next win-

ter which it may be necessary to make up by imports from other countries.

The buying movement, which is generally simultaneous with the fixing of ore prices, will rank this year among the later ones. It is generally true that in years of prosperity and great activity the buying for the season is done earlier than this. For example, the buying season for 1917 was one of the earliest on record, practically all of the ore having been contracted for within a few days preceding December 1, 1916. Ten years earlier, a record was made when the buying movement started on November 2, 1906, and another early buying period was that for delivery in 1913, which started November 19, 1912. In dull years, of course, the market has lagged, buying sometimes extending throughout the summer season.

The $1 advance of ore prices, causing the cost of pig making to be about $2 per ton higher, will certainly not have the effect of checking the upward trend of pig iron prices. This ore advance has been expected for some time, but the actual announcement will be welcome to both buyers and sellers, as it will give them a more definite basis in figuring on their season's business.

Expenditures and Wealth

The American people have not given a good account of themselves since the armistice in the matter of doing the work that it was said during the war was accumulating to be done after the war. There has been little creation of material wealth. The appraisal must be made in terms of the material things, not in terms of money value. The depreciation of the dollar's value makes it that many properties are worth more, in dollars, than before the war, but the properties are the same. In earning power, again, some properties, as those of public service corporations, have declined, because operating costs have increased more than incomes.

In the creation of material and permanent wealth, very little has been done, and relatively little is now being done. Despite the great industrial activity, a smaller proportion of the work than usual is being done in the creation of things that will survive. The railroad system has not been improved and there has been little construction of dwelling houses, office buildings, hotels and factories.

The subject of the creation of wealth and various kindred subjects all revert in the last analysis to the one big subject that is always in men's minds, that of "prosperity." Prosperity is more than activity for it involves advancement, making progress. Prosperity would not be the great goal, did it not involve promise of future happiness. It is sometimes remarked that present conditions need not be complained of because nearly everyone has a good income and is spending the income freely. To those who object to "the present extravagance," the rejoinder is made that no harm is done, that people are no more than spending their incomes, and savings banks deposits are increasing. If the condition of activity could be regarded as true prosperity, it could only be so regarded on the basis that the people elect to pursue happiness by this course. Now, it is obvious that such is not the case, for instead of the people being happy in their expenditures there is almost universal discontent.

The United States must enter upon a wealth-creating period or it will degenerate. By reason of the setback given by the war the creation of material wealth should be pursued with particular vigor, now that the war is ended. The period has not been entered upon but it must be entered upon some time, and thus the condition of the past year, and the present condition, cannot be regarded as permanent.

During the war it was a generally accepted doctrine that a period of hard and useful work of several years' duration would necessarily follow, both by reason of the loss of time occasioned by the war and by reason of the broadening of men's minds, whereby they would want more and had learned how to achieve more. Whatever the length of that period of constructive effort should be, the time that has elapsed since the armistice is not now to be deducted. The time has constituted a sort of vacation, and the whole operation, whatever it may be, still lies before us. We have had lavish expenditures, but they have not been largely expenditures in the direction of creating permanent wealth.

The steel industry has first-hand evidences of these conditions. There has been a heavy demand for steel, but an unprecedentedly small proportion of the steel demand is in connection with work of permanent value. It had never been supposed that there could be as large demand for steel as there has been, without great quantities passing into construction work and to the railroads. While there has not been full output, the production has exceeded the outputs in years before the war when large proportions of the steel made went into permanent employment.

The Call for Better Transportation

It avails one of nothing if he moves to expand his plant or to take on new lines of manufacture, and the railroads of the country are inadequate either to supply him with raw materials or to take away his increased manufactured product. Time was when railroads proved unattractive as investment propositions because they had been stretched out in regions where there was too little transportaion business offered. Now we seem to have a situation in which there is far more business than railroad facilities can handle. The seriousness of the fact can hardly be better stated than to draw from the statistics gathered by the *Railway Age*. It appears that only 22,062 freight cars for domestic use were ordered in 1919, or only one-third of the smallest purchases of any year since 1901, 62,669 being ordered in 1908. Of locomotives the insignificant number of 214 was contracted for, compared with 1182, the smallest previous number ordered in a single year. In three years there has been a decrease of 933 miles in railroad trackage. Industry would probably not object to a brief extension of the period of Government control, if it would mean concentration on transportation betterment even

to exercising war powers of commandeering of car, locomotive and equipment shops to make up in part for the long period of vacillation since the need was everywhere apparent.

Steel Output in Britain

Evidence is yet to be furnished of the 12,000,000 tons and more of steel capacity to which the United Kingdom was reported to have risen during the war. A British iron journal remarked about the time of the armistice that this was the claim of "politicians." The statement of greatly increased British capacity received considerably credence in the United States.

A preliminary report of steel production in the United Kingdom in 1919 shows a total of about 7,880,000 tons of ingots, this comparing with 9,591,000 tons in 1918, and 7,664,000 tons in 1913. Capacity under normal conditions may be taken at about 10,000,000 tons, for there was little, if any, restriction of output during the war, such as occurred in the United States.

The shortage of 20 or 25 per cent in output in 1919 is attributable chiefly to shortage of coke, the testimony being that there was little, if any, shortage of orders, while labor performance was fair. A remarkable showing of the production statistics, which are given by months, is that the record month of the year was March, while after May the best month was September. On the whole, production has not been increasing, but rather the reverse.

The course of export trade, month by month, was quite different from the course of production, there being an irregular but marked increase, with December's 228,788 tons proving to be the best of the year. Thus the domestic consumption showed a material decline.

Our own iron and steel exports in 1919 showed such variations from month to month that it is difficult to make any general comparison with the British exports. As to totals, we exported about 4,250,000 tons, against 2,250,000 tons of British exports, but on the other hand we have a steel industry approximately five times the size of the British.

British Steel Exports

It is a commentary on the present high price levels that the value of the British iron and steel exports for 1919, reported elsewhere in this issue, established a record although the total tonnage was only about one-half that of the 1913 movement. These exports last year were valued at £63,454,695 as compared with £54,729,302 in 1913. In tonnage the 1919 exports show also the first recovery since 1913. In that year the total amount was 5,040,000 tons, falling to 1,619,000 in 1918, but recovering to 2,454,000 tons in 1919. The average unit price in 1913 was thus about £11 per ton and in 1919 it was about £26.

The exports tell the story of the character of the world's chief needs. Steel plate exports from Great Britain in 1919 were 75 per cent greater than those of 1913. Exports of thin black sheets were almost double, while those of such sheets over ⅛ in. thick were 75 per cent above the 1913 exports. About the same weight of steel bars moved out in 1919 as in 1913, while the rail outgo was barely one quarter of that of the full pre-war calendar year. In short, there were few products in which last year's total exceeded the pre-war average. The most striking slump was the diminution in demand for galvanized sheets which fell from an exportation of 762,000 tons in 1913 to 8835 tons in 1918, recovering to 186,100 tons in 1919. Pig iron exports were not much over one-fourth of those in the year before the war.

The figures shed little light on what will prove to be the volume and kind of the future export trade. Nor can much be determined from the statistics of the imports, which as the figures show were only a fraction of the 1913 business in both finished and semi-finished steel. It will be the statistics of the succeeding months which will tell the story of the degree of recovery from the mental sickness which has been particularly acute in Great Britain, and then it will probably be in order to attempt to study the realignment of international business among the iron and steel producing nations of the world.

Ingot Molds and Rejected Ingots

A correspondent recently wrote to THE IRON AGE asking for definite information in regard to tonnage of ingots made in the United States, and also the percentage of rejected ingots in ordinary steel practice. The inquiry was referred to a large manufacturer of ingot molds, who is well posted on this subject, and his reply will be of interest. It is as follows:

"With reference to the production of steel ingots in the United States, the tonnage reported for the year 1917 was 45,000,000; for the year 1918, 50,000,000, and for the year 1919, approximately 43,000,000 tons. All of this tonnage, of course, is cast into ingot molds. With reference to the percentage of rejected ingots on account of pipes, honeycombs or other reasons, this should not run, under normal practice, more than one per cent, and in all probability is less than this amount, although it is absolutely impossible to ascertain the exact percentage. The figure given you of about 18 to 20 per cent would include all scrap losses on the mills regardless of what per cent was cropped on the ingot, as each process of finishing crops a certain amount due to feathered edges or irregular rolling, but the most of their croppage is due to making certain lengths and the overrun in length will run anywhere from two to eight feet. These short pieces, of course, are scrap and are called 'crops,' but are not necessarily due to poor practice or to poor material.

"The amount of actual croppage on the ingot itself due to piping or segregation would be just as hard to ascertain as the number of rejected ingots, as this is a question entirely of steel plant practice. There is bound to be some croppage in any event, and it would be impossible, in my judgment, to ascertain the actual loss due to piping and segregation, for the reason that you are bound to have some loss due to feathered edges, etc. I presume on highly finished sheets the total loss in rolling would amount to approximately 15 to 18 per cent of the steel originally poured. The only steel companies manufacturing their own ingot molds in the United States are the United States Steel Corporation, which manufactures a part of its requirements, as does also the Bethlehem Steel Co., while the Lackawanna Steel Co., Jones & Laughlin Steel Co. and the Colorado Fuel & Iron Co. manufacture their entire requirements. All the other companies buy their ingot molds on the market. None of the steel companies to-day uses an ingot mold made from steel, as experience has taught them that it is not an economical practice, and they all use cast iron molds. There have been a number of ingot mold patents to eliminate piping and segregation, but the best that can be said for any of them is that they

have reduced, to a certain extent, these features, but in no case have they been able to eliminate them entirely.

"This is a matter that all of the steel officials have given a great deal of consideration for a number of years and nobody has yet put on the market any idea that will successfully eliminate it. In most cases the reduction in the amount of piping and segregation achieved by the patents issued has resulted in an increased cost which more than offsets the saving effected, and for that reason they have never been generally adopted."

Steel Corporation Grants Wage Advance

The ninth advance in wages since Jan. 1, 1916, has just been granted to the laborers of the United States Steel Corporation, amounting to approximately 10 per cent. This step has been followed by some of the leading independents, including the Jones & Laughlin Steel Co. The advances in the Steel Corporation will affect about 275,000 men.

The following are the dates and percentages of previous advances of the corporation: Feb. 1, 1916, 10 per cent; May 1, 1916, 10 per cent; Dec. 15, 1916, 10 per cent; May 1, 1917, 10 per cent; Oct. 1, 1917, 10 per cent; April 15, 1918, 15 per cent; Aug. 1, 1918, 10 per cent; Oct. 1, 1918, 10 to 16 2/3 per cent (through reduction of working hours).

The number of employees of the corporation has increased from 168,127 in 1902 to about 250,000 at the present time. The total amount of the corporation's pay roll in 1918 was $452,663,524, and last year it was larger. The largest number of employees on the pay roll in any one month of 1918 was 283,414, while the average daily wage for the year was $5.38, compared with $4.16 in 1917. In 1912 this average was $2.75.

Lake Superior Iron Ore Association

At the annual meeting of the Lake Superior Iron Ore Association, held Jan. 31, figures were presented showing the increase in the cost of production on the various ranges during 1919. These show that the average profit on non-Bessemer ore produced by the underground mines on the Mesaba range was 7 cents a ton last season. An effort will be made to secure a reduction in the carrying charges on ore from the mines to the upper lake ports and a committee was appointed to take this matter up with the railroads as soon as the roads are returned to their owners. The carrying charge at present from the Minnesota mines to the docks is $1 per ton, as compared with a 55c. rate prevailing a few years ago, and the advance in rates from other mining districts has been in about the same proportion. A resolution was adopted requesting the railroads to continue with the ore and coal exchange. The following officers were elected: F. B. Richards, president; E. E. Allen, vice-president; H. G. Dalton, vice-president; H. S. Stebbins, treasurer; W. L. Tinker, secretary.

Braddock Mfg. Co. Sold

The Braddock Mfg. Co., Braddock, Pa., steel founder and machinist, announces the sale of its plant to the Wilson-Snyder Mfg. Co., Pittsburgh, manufacturer of pumps and piping equipment. The new owner will continue to build a general line of rolling mill machinery and equipment, formerly made by the Braddock Mfg. Co. The latter has not yet fully decided on its plans, but has retained its charter and all its assets, except the Braddock plant. W. E. Troutman, president and R. W. Tener, treasurer, retired upon consummation of the sale, and F. C. Sullivan, vice-president and engineer, will retire March 1. H. L. Campbell and F. B. McConnell, other officers of the old company, will remain with the new owners. The Braddock Mfg. Co. was organized in 1901 by Carnegie Steel Co. officials, who retired five years ago, when the present owners of the charter purchased their holdings.

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Coke Producers' Association

UNIONTOWN, PA., Feb. 4.—Members of the Coke Producers' Association, composed of leading independent operators of the Connellsville regions, at a meeting here realized the necessity of making the association a more active organization and directed its president, Harry Whyel, of the Consolidated Coke Co., to call regular meetings of the members that an open forum might be established for the discussion of trade problems. Efforts have heretofore been made to create through the association an organization through which trade policies could be interpreted to the allied steel industry.

May Build Car Works

BIRMINGHAM, Ala., Feb. 2.—Impression in Birmingham industrial circles is that the next new mill of the Tennessee Coal, Iron & Railroad Co. in Alabama will be a pressed steel car works contiguous to the new steel mills in Fairfield, these new mills to be built by the Chickasaw Shipbuilding & Car Co., the Tennessee company's auxiliary. There is, however, nothing definite known and no official statement has been issued.

Will Build Cleveland Plant

CLEVELAND, Feb. 3.—The Ewing Bolt & Screw Co. has been organized by Myles E. Ewing, formerly secretary of the Falls Rivet Co., Kent, Ohio, Cleveland and Detroit interests, and will build a plant in Detroit for the production of screws, bolts, nuts, rivets, etc.

FURNACES MORE ACTIVE

January Production Exceeds December by Nearly 400,000 Gross Tons

Substantial Gains at Chicago, in Ohio and in the Pittsburgh District—290 Furnaces in Blast February 1

The production of pig iron in January amounted to 3,015,181 gross tons or 97,264 tons daily as compared with 2,633,268 tons or 84,944 tons daily in December, 2,392,350 tons or 79,745 tons daily in November, and 3,302,260 tons or 106,525 tons daily in January 1919. The greatest gains were of over 100,000 tons or 26.5 per cent over January in the Chicago district, over 60,000 tons or 30 per cent in central and northern Ohio, over 40,000 tons or 6.5 per cent in the Pittsburgh district. In all 39 furnaces were blown in January and 11 were blown out, a net gain of 28, making a total of 290 stacks of 99,465 gross tons estimated daily capacity active Feb. 1 as compared with 262 furnaces of 87,945 tons capacity active Jan. 1. The January output of ferroalloys amounted to 23,957 gross tons.

Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces for January, and the three months preceding:

Pig Iron Production by Districts—Gross Tons

	Jan. (31 days)	Dec. (31 days)	Nov. (30 days)	Oct. (31 days)
New York	154,090	134,609	130,335	95,897
New Jersey	0	3,732	5,000	5,340
Lehigh Valley	99,382	81,347	100,402	91,593
Schuylkill Valley	95,569	80,901	69,876	67,368
Lower Susquehanna and Lebanon Valleys	46,670	36,667	50,540	40,719
Pittsburgh district	695,442	653,273	646,122	579,439
Shenango Valley	150 977	146,822	147,795	132,595
Western Pennsylvania	164,616	144,432	83,867	66,928
Maryland, Virginia and Kentucky	79,622	66,662	65,101	59,943
Wheeling district	83,630	57,325	16,801	8,675
Mahoning Valley	299,597	277,450	173,334	37,805
Central and Northern Ohio	267,861	206,020	195,107	154,102
Southern Ohio	64,461	64,124	62,526	68,094
Chicago district	487,840	385,399	376,378	172,431
Mich., Minn., Mo., Wis., Colo. and Wash.	98,487	77,164	64,730	56,547
Alabama	202,236	202,105	187,833	213,298
Tennessee	24,701	15,236	16,603	12,784
Total	3,015,181	2,633,268	2,392,350	1,863,558

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from January, 1919, is as follows:

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works	Merchant	Total
January, 1919	78,388	28,137	106,525
February	78,910	26,096	105,006
March	73,468	26,217	99,685
April	61,289	21,318	82,607
May	51,187	16,815	68,002
June	51,865	18,630	70,495
July	61,503	16,837	78,340
August	68,018	20,478	88,496
September	60,954	21,978	82,932
October	41,796	18,319	60,115
November	57,589	22,156	79,745
December	61,815	23,129	84,944
January, 1920	72,015	25,249	97,264

The figures for daily average production, beginning with January, 1914, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1914—Gross Tons

	1914	1915	1916	1917	1918	1919	1920
Jan.	60,808	51,659	102,746	101,643	77,799	106,525	97,264
Feb.	67,453	59,813	106,456	94,473	82,835	105,006	.....
Mar.	75,738	66,575	107,667	104,882	103,648	99,685	.....
Apr.	75,655	70,550	107,592	111,165	109,607	82,607	.....
May	67,506	73,015	108,422	110,238	111,175	68,002	.....
June	63,916	79,361	107,053	109,002	110,793	70,495	.....
July	63 150	82,691	104,017	107,820	110,354	78,340	.....
Aug.	64,363	89,666	103,346	104,772	109,341	88,496	.....
Sept.	62,753	95,085	106,745	104,465	113,942	82,932	.....
Oct.	57,361	100,822	113,189	106,550	112,482	60,115	.....
Nov.	50,611	101,244	110,394	106,859	111,802	79,745	.....
Dec.	48,896	103,333	102,537	92,997	110,762	84,944	.....

The furnaces blown in include one Lackawanna and one Susquehanna in the Buffalo district; one Palmerton in the Lehigh Valley; No. 3 Swede and one Worth in the Schuylkill Valley; Lochiel in the lower Susquehanna Valley; Lebanon Valley stack in the Lebanon Valley; No. 5 Duquesne, one Eliza and No. 2 Monessen in the Pittsburgh district; Claire and Stewart in the Shenango Valley; Marshall, Punxy and Rebecca in western Pennsylvania; one Virginia Iron, Coal & Coke stack in Virginia; No. 1 Bellaire, No. 2 Mingo, No. 2 Riverside and Martins Ferry in the Wheeling district; Hannah and No. 1 Haselton in the Mahoning Valley; one Central, one Columbus, one Toledo, United and Upson in central and northern Ohio; Jisco in southern Ohio; one Calumet, one Iroquois, one Gary and one Madeline in the Chicago district; A, B and D stacks of the Colorado Fuel & Iron Co.; Jenifer and No. 1 Bessemer in Alabama; La Follette and Rockdale in Tennessee.

Among the furnaces blown out are Genesee in northern New York; three Bethlehem stacks in the Lehigh Valley; No. 3 Steelton in the lower Susquehanna Valley; one Lebanon in the Lebanon Valley; one Youngstown and one Hubbard in the Mahoning Valley, and Zenith in Minnesota.

Production of Steel Companies

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies show the following totals of steelmaking iron month by month, together with ferromanganese and spiegeleisen. These last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies—Gross Tons

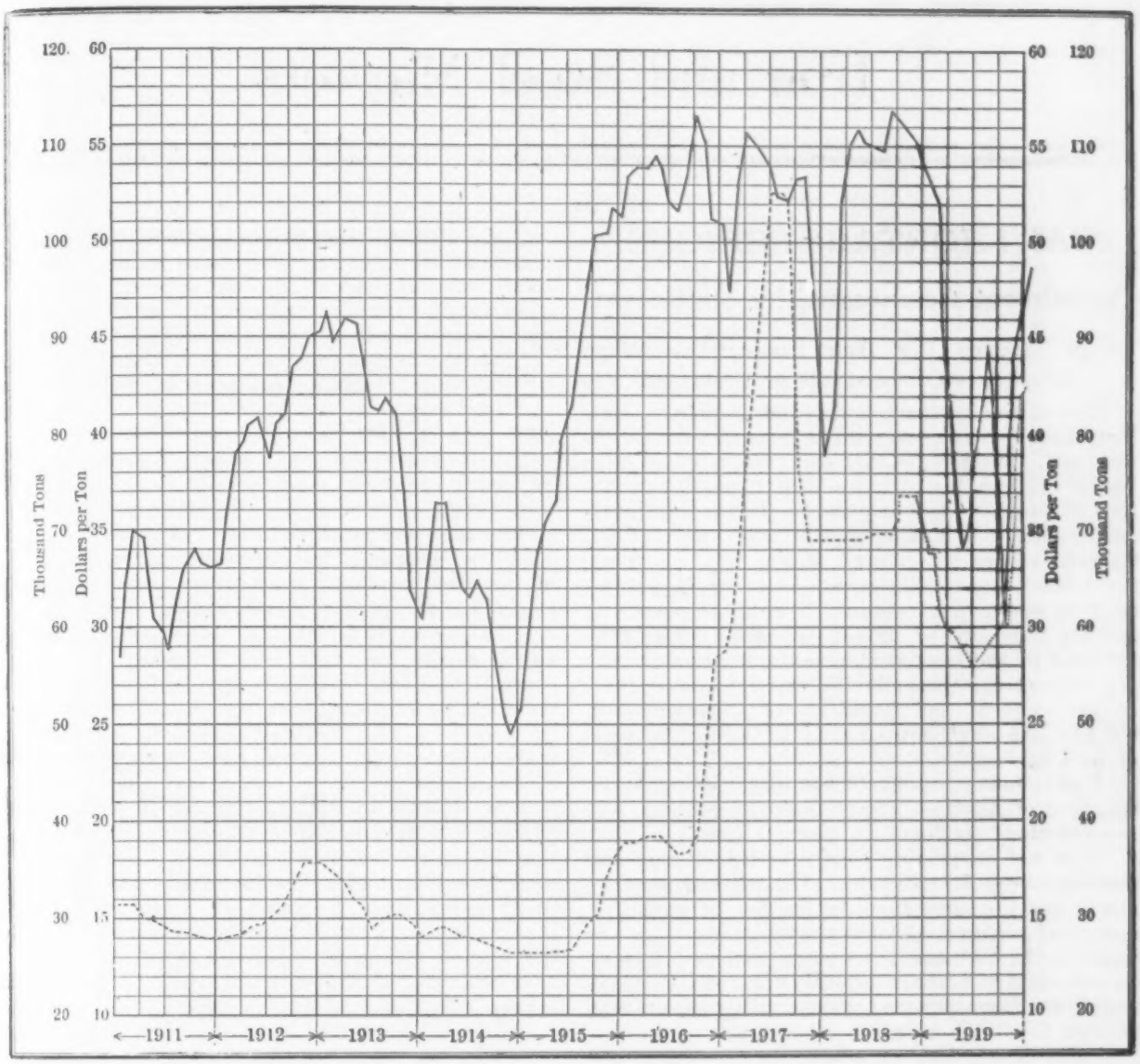
	Total production			Spiegeleisen and ferromanganese		
	1918	1919	1920	1918	1919	1920
Jan.	1,756,208	2,430,022	2,232,455	30,695	32,787	23,957
Feb.	1,620,254	2,209,470	.....	26,114	28,105	.....
Mar.	2,349,419	2,277,507	.....	39,122	26,644	.....
Apr.	2,411,488	1,838,677	.....	35,511	17,308	.....
May	2,513,577	1,586,805	.....	54,633	14,604	.....
June	2,407,166	1,655,944	.....	44,844	14,254	.....
July	2,456,693	1,906,604	.....	51,762	14,805	.....
Aug.	2,509,357	2,108,566	.....	54,009	17,419	.....
Sept.	2,507,381	1,828,613	.....	66,275	20,631	.....
Oct.	2,594,277	1,295,690	.....	70,379	20,238	.....
Nov.	2,501,867	1,727,656	.....	59,638	19,964	.....
Dec.	2,524,794	1,916,249	.....	49,435	15,718	.....

Capacities in Blast Feb. 1

The following table shows the number of furnaces in blast Feb. 1 in the different districts and their capacity, also the number and daily capacity in gross tons of furnaces in blast Jan. 1:

Coke and Anthracite Furnaces in Blast

Location of Furnaces.	Total stacks	Feb. 1: In blast	Feb. 1: Capacity per day	Jan. 1: In blast	Jan. 1: Capacity per day
New York:					
Buffalo	22	14	4,760	12	4,040
Other New York	4	2	330	3	680
New Jersey	5	0	0	0	0
Pennsylvania:					
Lehigh Valley	18	10	2,260	13	2,480
Spiegel	2	2	300	1	150
Schuylkill Valley	15	12	3,450	10	2,640
Lower Susquehanna	9	2	630	3	690
Ferro	1	2	140	1	75
Lebanon Valley	9	2	390	3	420
Ferro	1	1	40	0	0
Pittsburgh district	53	49	22,130	47	20,860
Ferro and Spiegel	5	3	400	2	215
Shenango Valley	19	16	5,000	14	4,815
Western Penn	27	19	5,385	16	4,615
Ferro	1	1	75	1	60
Maryland	4	4	1,265	4	945
Wheeling District	15	9	3,115	5	1,945
Ohio:					
Mahoning Valley	27	22	9,710	22	9,400
Cent. & North	26	21	9,175	16	6,710
Southern	17	13	2,125	12	2,220
Illinois and Ind.	39	33	16,315	29	14,075
Ferro	1	1	100	1	75
Mich., Wis. and Minn.	13	7	3,070	8	2,500
Colo., Mo. and Wash.	8	3	835	0	0
The South:					
Virginia	17	7	805	6	580
Kentucky	7	3	345	4	725
Alabama	45	23	6,455	22	6,450
Tennessee	17	9	860	7	540
Total	428	290	99,465	262	87,945



The Full Line Represents the Daily Production of Pig Iron and the Dotted Line Is the Average of the Price Per Ton of No. 2 Southern Pig Iron at Cincinnati, Local No. 2 Iron at Chicago and No. 2X Iron at Philadelphia

Diagram of Pig Iron Production and Prices

The fluctuations in pig iron production from 1910 to the present time are shown in the accompanying chart. The figures represented by the heavy line are those of daily average production by months of coke and anthracite iron. The dotted curve on the chart represents monthly average prices of Southern No. 2 foundry pig iron at Cincinnati, local No. 2 foundry iron at furnace at Chicago, and No. 2 X at Philadelphia. They are based on the weekly quotations of THE IRON AGE.

Production of Coke and Anthracite Pig Iron in the United States by Months, Beginning Jan. 1, 1916—Gross Tons

	1916	1917	1918	1919	1920
Jan.	3,185,121	3,150,938	2,411,768	3,302,260	3,015,181
Feb.	3,087,212	2,645,247	2,319,299	2,940,168	.....
Mar.	3,337,691	3,251,352	3,213,091	3,090,243	.....
Apr.	3,227,768	3,334,960	3,288,211	2,478,218	.....
May	3,361,073	3,417 340	3,446,412	2,108,056	.....
June	3,211,588	3,270,055	3,323,791	2,114,863	.....
July	3,224,513	3,342,438	3,420,988	2,428,541	.....
Aug.	3,203,713	3,247,947	3,389,585	2,743,388	.....
Sept.	3,202,366	3,133 954	3,418,270	2,487,965	.....
Oct.	3,508,849	3,303,038	3,486,941	1,863,558	.....
Nov.	3,311 811	3,205,794	3,354,074	2,392,350	.....
Dec.	3,178,651	2,882,918	3,433,617	2,633,268	.....
Total, Yr.*	39,039,356	38,185,981	38,506,047	30,582,878	.....

*These totals do not include charcoal pig iron. The 1918 production of this iron was 347,224 tons.

Blast furnace No. 3 of the Steelton plant of the Bethlehem Steel Co., has been banked because of the shortage of coal, and as a means of coal conservation.

Alan Wood Iron & Steel Co. Elect New Officers

The election of Richard G. Wood as chairman of the board of directors of the Alan Wood Iron & Steel Co., Philadelphia, has resulted in the following changes in the personnel of the company, effective Jan. 29:

Chairman of the board of directors, Richard G. Wood; vice-chairman board of directors, Jonathan R. Jones; president, W. W. Lukens; vice-president, Ledyard Heckscher; vice-president, Howard Wood, Jr.; treasurer, Howard Wood, Jr.; assistant treasurer, A. M. Harry; secretary, John W. Logan; assistant secretary, A. M. Harry; purchasing agent, Alan D. Wood; general manager of sales, Charles O. Hadly; assistant general manager of sales, Willard S. Haring; comptroller, J. H. Woodhead; cashier, Ira L. Couch; credit manager, J. B. McGlinn; traffic manager, N. L. Moon; assistant traffic manager, W. B. Hoffman; auditor, D. P. Sailer; assistant auditor, D. Bailey.

Blast furnace department—Manager, G. A. Heckscher; superintendent, George A. Black; assistant superintendent, Clarence G. Hanna.

Steel works department—Manager, Richard G. Wood, Jr.; general superintendent, John E. Mountain.

Sheet department, Schuylkill Iron Works Plant, J. Wood Plant—Manager, W. A. Cooper.

Safety and welfare department—Manager, Wilbur Collins.

A national standard truck cost system developed at a conference of truck owners and manufacturers is explained in a folder being distributed by the Truck Owners' Conference, 5 South Wabash Avenue, Chicago. Each folder contains sufficient forms for one truck for one year.

Iron and Steel Markets

CAR SHORTAGE SERIOUS

Curtailment Accentuated by Shut-downs

Large January Pig Iron Production — Wage Advance — Ore and Other Advances

The serious setback which the industry is getting through car shortage can hardly be over-emphasized. Inadequate coal and coke supplies have forced the banking of more blast furnaces; 50,000 tons of finished steel is piled in the leading interest's yards in Chicago waiting for cars and an Eastern maker has stored 30,000 tons of structural steel alone. Shipments in cases do not exceed 25 per cent of output. One steel plant can operate only two of its ten furnaces. Barely 50 per cent of the normal shipments of foundry coke are leaving the Connellsville district and at least 25 per cent of the foundries of Cleveland and vicinity are shut down partly or wholly because of lack of fuel.

The influenza epidemic has also had a marked effect on production. More than one mill has had one-fourth of its force on the sick list.

It is not surprising that scarcity of iron and steel has been accentuated. The marked developments are the accessions to the list of both iron and steel makers who have withdrawn from the market. In Chicago the leading interest has no shapes, plates or bars to sell, nor rails or track supplies. Some pig iron makers will book nothing further for 1920 delivery.

Sales of pig iron have been in very large volume, especially in foundry and malleable grades. Foundry is $1 per ton higher. There is now a lull, both buyers and sellers being willing to await developments. The shortage in basic iron is pronounced, several heavy inquiries remaining unsatisfied, and prices are naturally strong.

In spite of railroad difficulties the January performance of the blast furnaces of the country was better than any month since March, 1919. A net gain of 28 furnaces was made and a production of 3,015,181 tons compares with 2,633,268 tons for December, also a 31-day month. The daily average was 97,264 tons or 14½ per cent more than December, which averaged 84,944 tons daily. No less than 39 furnaces were blown in while 11 were banked or blown out.

The 290 blast furnaces in operation on Feb. 1 were operating at a rate of 99,465 tons a day against 87,945 tons for the 262 furnaces in blast on Jan. 1. January's performance corresponds to about 35,860,000 tons per annum, or 91½ per cent of the record production of 1918.

The Steel Corporation wage advance has hardly caused a ripple on the steel market as $1.50 or $2 more per ton would probably balance the increased wage cost. The new buying in large lots on contracts is closely averaging the prices of the early weeks of 1919, or $7 per ton above the so-called March 21 prices which the Steel Corporation has been maintaining. No new influences on prices are discernible save those which have been operating.

Semi-finished steel prices are mounting wildly. Thousand lot sales of billets have brought $52.50, 1800 tons was sold at $60 and smaller lots were done at $70 for nearby shipment. Sheet bars are up $5 per ton and forging billets $9.

The situation in finished steel can hardly be better told than by noting the sales of 9000 tons of soft steel bars to an automobile maker at 4.25c. and 2000 tons at 4.50c.

At the very time that financial arrangements are being completed on unusually large fabricated steel projects, structural mills are restricting the volume they will consider.

Plate business is fast approaching the tenseness of the sheet market. New orders can be written at 3.50c. only in exceptional cases. Appearances are that concerted action akin to the commandeering effect on the rail mills will be needed to secure prompt building of railroad cars and locomotives, if indeed any early decision is made in this respect.

Bar iron has been advanced $1 by leading makers, and a like raise has been made in charcoal iron boiler tubes.

The advance in the price of ore of $10 per ton has been followed by heavy selling and it is probable that the entire estimated output of the season will soon be disposed of to the furnaces. The advance, which is equivalent to about $2 in the cost of pig iron, is relatively not as important when iron is selling around $40 as it would ordinarily be.

The principal exporters of steel products are taking only such business as cannot be forestalled. Japan is the high bidder on any material that is available, but the policy of the leading exporters is to apportion their tonnage among various countries and Japan is getting no more than its share.

British hematite iron has been booked for Belgium. For neutrals, up to 240s., maker's works, is asked, corresponding even at the low rate of exchange to-day to over $40 per ton. A large business has been done in sheet bars for second and third quarters on basis of $87, also in terms of present exchange. Belgian plates ⅛ in. thick are offered at fancy prices from 4.8c. per pound for ⅛-in. plates to 5.3 for 1/16-in. plates, f.o.b. Liège.

American tin plate has been offered for immediate delivery at $11.20 c.i.f. United Kingdom for 50,000 boxes. For the Orient buyers are trying to close on 500,000 boxes. American tin plates have sold for export at $9 per base box, Pittsburgh.

Pittsburgh

PITTSBURGH, Feb. 3.

The advance of $1 per ton on old range and Mesaba Bessemer and non-Bessemer ores means an increase in cost of $2 a ton for making pig iron when the furnaces start to use this year's ore, and the only comeback the furnaces may have will be a possible reduction of 20c. a ton on upper rail rates, which would mean a saving of 40c. a ton on pig iron. This advance of $1 on ore seems to be fully justified from the poor statement of earnings of some companies in 1918 and 1919 put out recently by the Lake Superior Iron Ore Association, which showed that earnings per ton of ore by some of the producers in the two years named were very small. This additional cost of about $2 a ton in making pig iron will no doubt soon be reflected in

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Feb. 3, 1920	Jan. 27, 1920	Jan. 6, 1920	Feb. 4, 1919
No. 2 X, Philadelphia‡	$44.35	$44.35	$44.35	$36.15
No. 2, Valley furnace†	40.00	40.00	39.00	31.00
No. 2, Southern, Cin'ti†	43.60	43.60	40.60	34.60
No. 2, Birmingham, Ala.†	40.00	40.00	37.00	31.00
No. 2, furnace, Chicago*	40.00	40.00	40.00	31.00
Basic, del'd, eastern Pa.	**41.40**	39.25	39.00	33.90
Basic, Valley furnace	40.00	40.00	36.00	30.00
Bessemer, Pittsburgh	42.40	42.40	38.40	33.60
Malleable, Chicago*	40.50	40.50	40.50	31.50
Malleable, Valley	**42.00**	41.00	38.00	31.50
Gray Forge, Pittsburgh	**41.40**	40.40	38.40	31.40
L. S. charcoal, Chicago	**55.00**	52.50	45.00	38.85

Rails, Billets, Etc., Per Gross Ton:				
Bess. rails, heavy, at mill	45.00	45.00	45.00	55.00
O.-h. rails, heavy, at mill	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh	**52.50**	48.00	48.00	43.50
O.-h. billets, Pittsburgh	**52.50**	48.00	48.00	43.50
O.-h. sheet bars, P'gh	**55.00**	50.00	50.00	47.00
Forging billets, base, P'gh.	**73.00**	64.00	64.00	56.00
O.-h. billets, Phila	59.10	59.10	59.00	47.50
Wire rods, Pittsburgh	60.00	60.00	60.00	57.00

Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	3.75	3.75	3.745	3.145
Iron bars, Pittsburgh	**4.00**	3.50	3.50	3.50
Iron bars, Chicago	3.00	3.00	3.00	2.97
Steel bars, Pittsburgh	**3.00**	2.75	2.75	2.70
Steel bars, New York	3.27	3.27	3.27	2.97
Tank plates, Pittsburgh	**3.50**	3.00	2.65	3.00
Tank plates, New York	**3.77**	3.27	3.02	3.27
Beams, etc., Pittsburgh	**2.70**	2.55	2.45	2.80
Beams, etc., New York	**2.97**	2.82	2.82	3.07
Skelp, grooved steel, P'gh.	2.45	2.45	2.45	2.70
Skelp, sheared steel, P'gh.	2.65	2.65	2.65	3.00
Steel hoops, Pittsburgh	**3.50**	3.25	3.25	3.30

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Feb. 3, 1920 Cents	Jan. 27, 1920 Cents	Jan. 6, 1920 Cents	Feb. 4, 1919 Cents
Sheets, black, No. 28, P'gh.	**5.00**	4.60	4.35	4.70
Sheets, galv., No. 28, P'gh.	**6.50**	5.95	5.70	6.05
Sheets, blue an'l'd, 9 & 10.	**4.25**	3.80	3.55	3.90
Wire nails, Pittsburgh	4.50	4.50	4.50	3.50
Plain wire, Pittsburgh	**3.50**	3.25	3.25	3.25
Barbed wire, galv., P'gh.	4.45	4.45	4.45	4.35
Tin plate, 100-lb. box, P'gh.	$7.00	$7.00	$7.00	$7.35

Old Material, Per Gross Ton:				
Carwheels, Chicago	**$39.00**	$36.00	$34.50	$23.00
Carwheels, Philadelphia	**40.00**	38.00	33.00	23.00
Heavy steel scrap, P'gh.	**28.00**	27.50	26.00	15.00
Heavy steel scrap, Phila.	**26.50**	26.00	23.50	16.00
Heavy steel scrap, Ch'go.	**25.00**	24.00	24.00	15.00
No. 1 cast, Pittsburgh	**34.00**	33.00	32.00	19.00
No. 1 cast, Philadelphia	**41.00**	38.00	33.00	23.00
No. 1 cast, Ch'go (net ton)	39.50	39.50	35.50	19.50
No. 1 RR, wrot, Phila.	35.00	35.00	32.00	23.00
No. 1 RR, wrot, Ch'go (net)	**27.50**	26.00	25.00	15.50

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$6.00	$6.00	$6.00	$5.00
Furnace coke, future	6.00	6.00	6.00	6.00
Foundry coke, prompt	7.00	7.00	7.00	5.00
Foundry coke, future	7.00	7.00	7.00	7.00

Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	19.50	19.50	19.75	19.50
Electrolytic copper, N. Y.	19.25	19.25	19.50	18.75
Spelter, St. Louis	*9.00*	9.10	9.50	6.35
Spelter, New York	*9.35*	9.45	9.85	6.70
Lead, St. Louis	8.45	8.45	8.25	4.75
Lead, New York	8.75	8.75	8.50	5.05
Tin, New York	*59.00*	62.25	63.50	72.00
Antimony (Asiatic), N. Y.	11.25	11.25	9.75	7.50

higher prices for pig iron, semi-finished steel, and probably the whole line of finished steel products. Any reservations made for ore by furnace companies prior to the time the advance of $1 a ton was made, now automatically become contracts at the new prices, which are on a basis of $7.45 for old range Bessemer.

The whole market is showing signs of runaway prices, and where the advance will stop is a good deal of a question. There are no signs as yet that the market has reached the top, but, on the contrary, there is every indication that prices on pig iron, steel and finished steel products are going higher. There is acute shortage in supply of everything, and with an insistent demand from consumers, who are really bidding against each other to get material, prices are bound to go higher. There is an underproduction of everything in the steel trade, and a consuming demand far greater than the supply. The action of the United States Steel Corporation in adhering to the March 21 schedule of prices had some effect for a time, but this has now been lost in the wild scramble of jobbers and consumers to induce the furnaces and mills to take their orders. The situation is regarded as dangerous, not unlike that existing in 1907, and some large producers of pig iron and steel are regarding the future with apprehension.

The action of the Steel Corporation in advancing common labor 10 per cent, effective from Feb. 1, and also its announced intention of adjusting rates for skilled labor to a higher basis, add to the burden of consumers of iron and steel, as the independent steel companies must follow the same course. Under present conditions they will add the increased labor cost to prices for their products, and the consumer must pay it. The Jones & Laughlin Steel Co., other local steel concerns, and Youngstown, Ohio, steel interests have stated they will pay the advance in labor to be made by the Steel Corporation; in fact, they are simply compelled to do it.

There is no abatement in the demand for pig iron and steel of all kinds, which is very far ahead of the available supply. The acute shortage in basic iron has become worse, and some large consumers are scouring the market everywhere trying to find iron. The car supply is wretched and is adding to the discomfort of the furnaces and mills, which are using every effort to get out maximum production, but with shortage of cars, coal and coke, they cannot do so. Unless the car situation is relieved in a very short time, a number of blast furnaces that are now on the ragged edge for coke, will have to bank.

Pig Iron.—Consumers are up against probably the worst shortage in supply of basic iron the market has ever known, and it does not promise to be relieved while the shortage in cars, coal and coke continues. Furnaces are being besieged with inquiries for basic iron, which they are turning away in most cases, saying they have no iron to sell. New inquiry for basic is heavy, the Erie Forge Co. being in the market for 10,000 tons, Follansbee Brothers Co. for the same amount, Colonial Steel Co. for 5000 tons, or more, American Rolling Mill Co. for 5000 tons, for this and next month's shipment, while four or five other smaller inquiries for basic are in the market. Some sellers are now quoting basic at $42 and Bessemer at $43, but the actual market has not yet reached those figures. It is likely to do so before this week ends, as some consumers in distress for iron will no doubt pay these prices, or more, as they say they must have iron, or close down their plants. The demand for Bessemer iron is not as active as for basic, but there is very little to be had. Two or three good-sized sales of plain No. 2 iron have been made at $42 and $43, some sellers now quoting as high as $45 at furnace. The whole pig iron market is very strong in price, and seems likely to be higher within a short time. The Youngstown Sheet & Tube Co. has one Youngstown and one Hubbard furnace banked for lack of coke. No Pittsburgh stacks have yet gone out, but some may be

compelled to bank before this week ends, as they are on the ragged edge for coke. We now quote pig iron as follows, Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh districts being $1.40 per gross ton.

Basic	$40.00 to $41.00
Bessemer	41.00 to 42.00
Gray forge	39.00 to 40.00
No. 2 foundry	41.00 to 42.00
No. 3 foundry	40.00 to 41.50
Malleable, Valley	42.00 to 43.00

We note a sale of 4000 tons of basic made on Tuesday at $40 Valley furnace, but it is practically certain that no more could be had at this price.

Ferroalloys.—The demand for ferromanganese for delivery in last half of this year is still active, and consumers seem willing to cover their needs at $155, and even $160 per gross ton delivered for 76 to 80 per cent domestic. Sales of a considerable tonnage of domestic ferromanganese are reported at $155, and it is said $160 has been reached in some sales. Some consumers of spiegeleisen now regret they did not cover sooner, as prices have advanced $10 per ton, or more. Sellers are asking $5 to $10 advance in prices of 50 per cent ferrosilicon. Market indications now are that prices on all grades of ferroalloys will be higher, as the present demand seems greatly in excess of supply.

We quote 76 to 80 per cent domestic ferromanganese $155 to $160 for second half delivered, with a reduction of $1.50 to $1.75 per unit for lower percentages. We quote 50 per cent ferrosilicon at $85 to $90, and 18 to 22 per cent spiegeleisen at $55 to $57.50, delivered. Prices on Bessemer ferrosilicon are: 9 per cent, $56.50; 10 per cent, $59.50; 11 per cent, $62.50; 12 per cent, $66.10. We quote 6 per cent silvery iron, $45.75 to $46.25; 7 per cent, $50 to $50.50; 8 per cent, $52 to $52.50; 9 per cent, $54 to $54.50, and 10 per cent, $56.50 to $57. An advance of $3.30 per gross ton is charged for each 1 per cent silicon for 11 per cent and over on Bessemer ferrosilicon, and an advance of $2.50 per gross ton is charged for each 1 per cent silicon for 11 per cent and over on silvery iron. All the above prices are f.o.b. maker's furnace, Jackson or New Straitsville, Ohio, which have a uniform freight rate of $2.90 per gross ton for delivery in the Pittsburgh district.

Semi-finished Steel.—Very little steel is being sold in the open market, as it can hardly be had at any price. There have been actual sales of 3000 to 4000 tons of soft open-hearth 4 x 4 in. billets at $52.50, maker's mill, or higher. Slabs have sold at close to, or all, of $55 at mill, and it is said sheet bars have been sold for conversion into sheets at very close to $60 at mill. All the steel mills are short of billets and sheet bars. A large tin plate interest that is running very short of bars was told the other day by the mill that supplies it, that if it could get cars, several thousand tons lying on the ground could be shipped at once, but the cars could not be had. The demand for forging billets is active, and prices are up about $5 a ton.

We quote 4 x 4-in. soft Bessemer and open-hearth billets at $52.50 to $55; 2 x 2-in. billets at $55 to $57; slabs, $53 to $55; sheet bars, $55 to $60, and forging billets, $73 to $75 base, all f.o.b. at mill Pittsburgh or Youngstown.

We note sales of 300 tons or more of forging billets for fairly prompt delivery at $73 per gross ton, maker's mill.

Structural Material.—The inquiry is still very active, and while only a small amount of work was placed in the past week, a large amount is in sight, some of it in this city. The McClintic-Marshall Co. has taken 500 tons for a new steel building for the Aluminum Co. of America at New Kensington, Pa. New York architects are making plans for a very large bank building for the Mellon National Bank in this city, in the square bounded by Smithfield Street, Fifth Avenue and Oliver Avenue, that it is said will take 15,000 tons. A new Y. M. C. A. building on Wood Street will take about 5000 tons, and the Diamond National Bank has decided to go ahead with an addition to its building that will take about 700 tons. Large financial interests seem to have decided that present high costs of construction will last for several years, and they are now going ahead with projected buildings. We quote plain material up to 15 in. at 2.45c. to 2.70c., Pittsburgh, the lower price being that of the leading interest.

Plates.—It is doubtful whether any orders for plates could be placed, except in very exceptional cases, at less than 3.50c. at mill, and some mills are quoting as high as 4c. The two leading makers are filled up on plates for practically all of this year and new business must necessarily go to the smaller mills, who are now in position to exact high prices. Some steel car work is coming out, and the demand for plates from all kinds of consumers is abnormally heavy. The price of Carnegie Steel Co. on sheared plates of tank quality for very indefinite delivery remains at 2.65c. and another leading maker is quoting 2.90c. on very limited quantities to regular customers, but the general market prices by the smaller mills range from 3.50c. to 4c. at mill.

We now quote sheared plates of tank qualty, ¼-in. and heavier, at 2.65c to 2.90c for indefinite delivery and 3.50c to 4c by the smaller mills for delivery in two to three months or longer.

Sheets.—There seems to be a practical famine in the supply of sheets, and consumers who are in distress for sheets are making tenders of new business to the mills at prices carrying premiums of $10 to $20 per ton. It is understood some large plate producers are seriously considering making large additions to their plants.

We now quote No. 28 gage box annealed, one-pass black sheets at 4.35c. to 5c.; No. 28 galvanized, 5.75c. to 6.50c., and No. 10 blue annealed at 3.55c. to 4c., the lower prices named being the March 21 schedules.

Tin Plate.—Most of the tin plate manufacturers are running at 95 to 100 per cent of capacity, but output is not more than 85 per cent on the average, due to scarcity of sheet bars and also to inefficiency of labor. The scarcity of cars is holding up shipments, and operating and shipping conditions in the tin plate trade are very unsatisfactory. Wasters are now selling at $8 to $8.50 from stock. We now quote tin plate for domestic consumers for first half of the year delivery at $7 per base box, and for export $8.50 to $9 per base box, Pittsburgh.

Wire Rods.—There is an insistent demand for wire rods, but the available supply is very limited. Two local makers of rods say their output is greatly reduced because of scarcity of steel, and they have no more to sell in the open market. We note a sale of 150 tons of soft Bessemer rods at about $64 at mill for export and 300 tons of basic open-hearth rods at about $70 at mill, both for fairly prompt shipment. We quote soft Bessemer and open-hearth rods at $52 to $65, and high carbon rods at $75 to $100 at mill.

Wire Products.—Three of the independent makers of wire nails have made up new wire nail cards and will hold a meeting in a few days at which these new cards will be discussed and probably a new card evolved from the three, which will contain some radical changes over the present card. There is a strong demand for a new wire nail card, some of the jobbers favoring it just as much as the manufacturers. The demand for wire nails and wire shows no abatement and the mills are simply snowed under with business. The American Steel & Wire Co. is still attempting to control to some extent resale prices on wire nails and wire, but the legality of this proceeding is being seriously questioned. We continue to quote wire nails at $3.25 base to $4.25 and $4.50, and plain wire for manufacturing purposes at 3c. to 3.50c. The lower prices named are those of the American Steel & Wire Co., but this concern is said to be sold up for some months.

Iron and Steel Bars.—There is a very great scarcity in supply of steel bars, and several mills that are in position to ship out fairly promptly are quoting at 3.50c., and even higher. Prices on common iron bars have also been advanced, two local mills now quoting 4c. at mill. Two large makers of steel bars are reported sold up on all they can make over the rest of this year.

We quote steel bars at 2.35c. up to 3c. and 3.50c., when rolled from billets. We quote common bars at 4c. and refined iron bars 4.25c. in carloads, Pittsburgh plus full freight to point of delivery.

Hot-Rolled Strip Steel.—Mills are filled up for some months and prices are showing a sharp advance. We now quote hot rolled strip steel at 4.25c. to 5.50c., f.o.b. mill, Pittsburgh, and it is said sales have been made at higher prices.

Cold-Rolled Strip Steel.—The demand is very active. Makers are sold up for two or three months and prices have shown a sharp advance. We now quote cold-rolled strip steel at 7c. to 9c. per lb., and it is said some sales have been made at higher prices.

Spikes.—The new demand for railroad spikes is active and prices are higher. The Atchison, Topeka & Santa Fe has bought about 10,000 kegs, the Norfolk & Western 8000, and the Chicago, Burlington & Quincy 5000 kegs. Other roads have placed smaller orders and makers of railroad spikes are pretty well filled up over the next two or three months. Prices on all grades of spikes are at least 25c. per keg higher.

We quote standard spikes, 9/16 x 4½ in., at $3.60 base per 100 lb. in carload lots of 200 kegs of 200 lb. each, and small spikes, ⅝ in., 7/16 in. and smaller, at $4.00 to $4.25 per 100 lb. in carload lots of 200 kegs of 200 lb. each, plus usual extras. Boat and barge spikes, $4.00 to $4.25 per 100 lb. in carload lots of 200 kegs of 200 lb. each, f.o.b. Pittsburgh. Tie plates, $3.00 per 100 lb.

Nuts, Bolts and Rivets.—The demand for rivets is active, large consumers being covered for this quarter on the basis of $4.15 for structural and ship rivets and $4.25 for large boiler rivets.

Coke.—The car supply is no better, several large coke producers saying it was worse last week than it has been at any time. Many blast furnaces are in distress for coke, and unless they are able to get a larger supply soon, will have to bank. Coke producers say they are not selling any spot furnace or foundry coke, but are shipping their entire output, when they can get cars, on contracts. Basic iron has now reached $40, or higher, and contracts for coke made some time ago on a five to one basis will now net producers $8 per net ton at oven for their coke. The question is still up as to the legality of coke contracts made prior to the time the Government fixed prices on coal and coke, but there seems to be no doubt as to the validity.

Boiler Tubes.—A leading maker has advanced price of charcoal iron tubes 3½ to 4½ in. in size, about $10 per ton. Demand for locomotive and merchant tubes is very heavy and mills are sold up for some months. Discounts are given on page 437.

Iron and Steel Pipe.—The recent advance of $7 per ton made on all sizes of steel pipe by the independent mills is being very firmly held, and the mills would have no trouble whatever in entering orders at these high prices, but are not in position to accept them, being sold up for some months.

Old Material.—Local scrap dealers who have been predicting for several months that prices on all grades of scrap would advance heavily seem in a very good way to have their predictions verified. There is a scarcity in supply of practically all grades of scrap, and prices are very firm and likely to be higher. Local dealers do not seem anxious to sell, believing the market will advance further. Selected heavy steel scrap is not less than $28, and reports are that sales have been made at $29 delivered.

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh, delivered	$28.00 to $29.00
No. 1 cast for steel plants	34.00 to 35.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Franklin, Pa., and Pittsburgh	34.00 to 35.00
Compressed steel	24.00 to 25.00
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh district	19.00 to 20.00
Bundled steel stamping	18.00 to 19.00
No. 1 busheling	24.00 to 25.00
Railroad grate bars	24.00 to 25.00
Low phosphorus melting stock (bloom and billet ends, heavy plates) ¼ in. and heavier	32.00 to 33.00
Railroad malleable	26.00 to 27.00
Iron car axles	34.00 to 35.00
Locomotive axles, steel	33.00 to 34.00
Steel car axles	31.00 to 32.00
Cast iron wheels	33.00 to 34.00
Rolled steel wheels	27.00 to 28.00
Machine-shop turnings	18.00 to 18.50
Sheet bar crop ends (at origin)	30.00 to 30.50
Heavy steel axle turnings	20.00 to 21.00
Heavy breakable cast	25.00 to 26.00
Cast iron borings	20.50 to 21.00
No. 1 railroad wrought	28.00 to 29.00

Chicago

CHICAGO, Feb. 3.

The transportation situation is becoming so serious that in the opinion of some observers it cannot grow much worse without bringing on acute constipation of the entire economic system of the country. The leading interest has been forced to bank five furnaces within the past fortnight because of lack of coking coal. It is not only unable to secure its normal fuel requirements but cannot get sufficient railroad equipment to move its products. It now has approximately 50,000 tons of finished steel piled in its yards here waiting for cars. The same condition has forced a Northern merchant iron producer to pile 5000 tons at one of its plants. The scarcity of cars is hardly less pronounced than the delays of shipments in transit. In a number of cases, cars which have been on the road for eight weeks have not yet reached destination. Increasingly numerous complaints come from manufacturers dependent on the mills and furnaces stating that the failure of shipments of material to arrive has forced a curtailment of operation. The influenza epidemic has also affected some producers adversely, one mill reporting that 25 per cent of its force is on the sick list. This is, however, an extreme case, as reports from other sources would not indicate that operation generally has been seriously crippled on this account.

The steel market is characterized by much inquiry and little selling. The leading interest has withdrawn from the market on plates, shapes and bars, as well as rails and track supplies, and other mills selling in this district have practically nothing to offer.

Independent mills regard as inevitable advances in wages in conformity with the increase recently announced by the Steel Corporation, and point to the resultant increase in costs as further justification for higher prices than those established last March.

Pig iron appears to be still in an upward swing and scrap has advanced generally.

Pig Iron.—While there has been a slight falling off in inquiries, business is still active and a number of transactions have been closed at advanced prices. Standard Bessemer has sold at as high as $45, Ohio furnace. Copper free low phosphorus is firm at $47.50, Ohio stack and copper-bearing material is commanding $45, Eastern furnace. The two leading Southern producers of foundry iron are still in the market at $40 base Birmingham, one of them for first half delivery only and the other for the entire year. A number of smaller interests have withdrawn from the market whereas two Virginia producers have advanced to $42 base furnace for second half shipment. The leading local producer is still selling sparingly for last half at $40, and for spot shipment at $42. The Red River Silvery furnace has advanced its prices to the Jackson County level, but it still has an advantage of 40c. in freight to Chicago. Charcoal iron has advanced to $53 to $55 furnace.

The following quotations are for iron delivered at consumer's yards except those for Northern foundry, malleable and steel-making irons, including low phosphorus, which are f.o.b. furnace and do not include a switching charge averaging 50c. per ton.

Lake Superior charcoal, average sil. 1.50 (other grades subject to usual differentials), delivered at Chicago	$55.50 to $57.50
Northern coke No. 1, sil. 2.25 to 2.75	42.25
Northern coke foundry, No. 2, sil. 1.75 to 2.25	40.00
Northern high phos. foundry	40.00
Southern coke, No. 1 foundry and No. 1 soft, sil. 2.75 to 3.25	48.20
Southern coke, No. 2 foundry, sil. 2.25 to 2.75	46.60
Southern foundry, sil. 1.75 to 2.25	45.00
Malleable, not over 2.25 sil	40.50
Basic	39.00
Low phos. (copper free)	47.50
Silvery, 7 per cent	$53.90 to 54.30

Plates.—This product is rapidly approaching the condition which has characterized sheets for some time. The leading interest has definitely withdrawn from the market, while the foremost independent has not taken new business for weeks. Outside producers represented in this district also have nothing to offer. In the meantime, inquiries continue to pour in, and the railroads

show increased interest in new rolling stock. Car builders anticipated their needs to a certain extent by placing contracts with the mills, but if the carriers make heavy purchases of cars they will have to expect delays in delivery on a considerable portion of them. The Union Pacific has divided an order for 3000 refrigerator cars among a number of Western car builders. Most of the steel for the bodies, amounting to about 6000 tons, will be furnished by the foremost steel interest on existing contracts. The leading independent will supply about 4000 tons and the Bethlehem Steel Co. the remaining tonnage for the underframes, which will be fabricated by the Bettendorf company. The Great Northern is expected to close this week for 1000 ore cars of 75 tons capacity. The Chicago, Burlington & Quincy has ordered five locomotives from the Baldwin Locomotive Works and the Grand Trunk is in the market for 35 engines.

Structural Material.—The leading interest has closed its books to new business and the Inland Steel Co. has nothing to offer except small tonnages in heavy shapes which will fit into the rolling schedule of its 28-in. mill. The scarcity of structural material is restricting the operations of fabricators, the leading company now being out of the market and a number of others nearly so. The largest new project in prospect is a bridge over the Ohio River for the Cincinnati Southern Railroad, which will involve 14,000 tons of steel. The leading award of the week is 1000 tons for a plant addition for the Kewaunee Boiler Co., Kewaunee, Ill., to be fabricated by the Lackawanna Bridge Co. Recent lettings include:

Oliver Chilled Plow Works plant, South Bend, Ind., 646 tons, to Whitehead and Kales.
City of St. Louis, two freight handling cranes for municipal docks, with combined capacity of 400 tons per hr., to Lakeside Bridge and Steel Co., Milwaukee.
H. W. Johns-Manville Co., Waukegan, Ill., electric coal handling Gantry crane, capacity 125 tons per hr., to Lakeside Bridge and Steel Co.
International Harvester Co., Assembly Building for Tractor Works, Chicago, 385 tons, to Rochester Bridge Co.
Utah Oil Refining Co., two steel tanks, Salt Lake City, Utah, 128 tons, to Kansas City Structural Steel Co.
Doelger and Kirsten, Milwaukee, machine shop, 115 tons to Lakeside Bridge and Steel Co.

Current inquiries include:

Hibernian Bank Building, New Orleans, 4000 tons.
Commercial Union Assurance Co. Building, San Francisco, 1400 tons.
Chicago & Northwestern Railroad, 1000 tons, bridge work.
DuPont Engineering Corporation, plant for General Motors Corporation, Pontiac, Mich., 500 tons.
Garford Truck Co., plant addition, Lima, Ohio, 500 tons.

The mill quotation is 2.45c. Pittsburgh, which takes a freight rate of 27c. per 100 lb. for Chicago delivery. Jobbers quote 3.47c. for materials out of warehouse.

Bars.—With the local producers out of the market and outside mills consistently turning away business, the problem of the consumer of mild steel bars is indeed a difficult one. The situation in iron and rail carbon steel bars is also becoming acute. Mills producing these products are confining their restricted sales to old customers and in most cases are leaving the price undetermined until the time of delivery, this being a safeguard against possible advances in scrap. One rail carbon mill which is booked ahead until May is invoicing February shipments at 3.50c. Bar iron has advanced and is now selling at 3.25c. to 3.50c., Chicago mill, except in the case of transactions which leave the matter of price open until time of shipment.

Mill prices are: Mild steel bars, 2.35c. to 3.25c. Pittsburgh, taking a freight of 27c. per 100 lb.; common bar iron, 3.50c. to 3.75c., Chicago; rail carbon, 3.25c. to 3.50c., mill. Jobbers quote 3.37c. for steel bars out of warehouse.

Sheets.—The sheet situation is tense, although it is said that a few mills will be able to take on additional tonnage for second quarter provided they can secure the sheet bars. What they will quote will be influenced by the cost of the raw material and labor, and cannot be forecast at present writing. Mill representatives are besieged with offers of premiums. One interest recently rejected a tender of 15c. per lb. on 150 tons of either galvanized or black for delivery in six weeks. The efforts of consumers have extended to the jobbers. A prominent automobile manufacturer recently made a thorough canvass of the warehouses of the country and bought all the sheets they were willing to sell at premiums ranging from $5 to $25 a ton above jobbers' quotations. The ensuing mill quotations are of little significance except as in indication of prices ruling on previous commitments for first quarter delivery.

Mill quotations are: 4.60c. for No. 28 black; 3.80c. for No. 10 blue annealed, and 5.95c. for No. 28 galvanized, these all being Pittsburgh prices, subject to a freight of 27c. per 100 lb. to Chicago. Jobbers quote Chicago delivery out of stock: No. 10 blue annealed, 5.32c.; No. 28 black, 6.50c.; No. 28 galvanized, 8c.

Wire Products.—While operation continues to improve, shipments are being delayed by a shortness of cars and motive power. Some shipments which have been in transit since the middle of December have not yet reached the consignees. The demand shows no signs of abatement and greatly exceeds the supply of the wire mills. For mill prices see finished iron and steel, Pittsburgh, page 437.

Rails and Track Supplies.—The Illinois Steel Co. is out of the market on rails, its present commitment being sufficient to employ its rolling capacity at the present rate of operation until the end of the year. The Santa Fé has placed orders to be followed shortly by the formality of contract signatures, for 70,000 tons of rails, 15,000 tons to be rolled by the Illinois Steel Co. and 55,000 tons by the Colorado Fuel & Iron Co. In additon to its commitments with Western railroads recently published in detail in this column, the Illinois Steel Co. will roll 40,000 tons for the Pennsylvania lines, 15,000 tons for the Chesapeake & Ohio and 10,000 tons for the Baltimore & Ohio. The Carnegie Steel Co. will also supply about 45,000 tons to the Pennsylvania, while the corporation's total order from the Baltimore & Ohio, including the tonnage to be rolled here, aggregates 40,000 tons. The Illinois Steel Co. is turning away numerous inquiries for light rails emanating from both domestic and Asiatic sources. Its inability to take new business in light rails, however, is regarded as a temporary condition.

Standard railroad spikes, 3.35c. to 3.60c. Pittsburgh. Track bolts with square nuts, 4.90c. to 5c., Pittsburgh. Steel tie plates and iron angle bars, 2.75c., Pittsburgh and Chicago; tie plates, iron, 3.25c., f.o.b. makers' mills. Light rails, 2.45c. f.o.b. makers' mills, with usual extras.

Bolts and Nuts.—Bolt and nut production has been sharply curtailed by a marked reduction in receipts of raw material resulting from the unsatisfactory transportation situation. The decrease in output is forcing up costs with the consequence that another advance in prices is regarded as unavoidable. At the same time the activities of consumers are such as to encourage upward price tendencies. Buyers have recently offered premiums of as high as 50 per cent, although without apparent success. One important bolt and nut manufacturer reports that its contracts for first quarter have already been taken out in specifications, and that consumers are pressing hard for additional lots in excess of their existing commitments.

For mill prices see finished iron and steel, Pittsburgh, page 437.

Jobbers quote: Structural rivets, 4.97c.; boiler rivets, 5.07c.; machine bolts up to ¾ x 4 in., 35 and 5 per cent off; larger sizes, 25 and 5 off; carriage bolts up to ¾ x 6 in., 30 off; larger sizes, 20 off; hot pressed nuts, square tapped and hexagon tapped, $1.45 off; coach or lag screws, gimlet points, square heads, 40 and 5 per cent off. Quantity extras are unchanged.

Cast Iron Pipe.—The demand for pipe has not been adversely affected by the recent advance. On the contrary, inquiry is general and covers all sizes. On 4 to 8-in. pipe inclusive, the best delivery is from 45 to 60 days and even this is uncertain under present transportation conditions. A leading pipe foundry, in fact, has asked all its customers to leave the matter of shipment to maker's convenience, as the acute car shortage makes delays in transportation unavoidable both as regards pig iron and finished product. Detroit has awarded 11,000 tons, ranging from 6 to 24-in., to the United States Cast-Iron Pipe & Foundry Co. Pontiac, Mich., has let 2100 tons to the American Cast Iron Pipe Co., and Fort Dodge, Iowa, has given a contract for 155 tons to the National Cast Iron Pipe Co.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., $72.80; 6-in. and above, $69.80; class A and gas pipe, $2 extra.

Old Material.—Scrap has taken a stronger tone and has advanced in most grades from 50c. to $3 a ton. Rolling mill grades have been particularly active, a

total of about 4000 tons of No. 1 wrought having been purchased by consumers within the past week at about $28.50 per net ton. In the absence of buying by local steel plants, heavy melting steel has been shipped to Eastern markets where attractive prices have been offered, as high as $30.50 having been paid for this grade of scrap in the valleys. Shipments to that section of the country, however, have been limited of late by railroad embargoes. The car situation in general is unsatisfactory and together with a shortage of labor in scrap yards is impeding the operations of dealers. The Baltimore & Ohio offers 4000 tons and the Chicago & Northwestern 2500 tons. The Burlington has withdrawn the list of 3000 tons which it issued last week.

Per Gross Ton

Iron rails	$33.00 to $34.00
Relaying rails	40.00 to 50.00
Car wheels	39.00 to 40.00
Steel rails, rerolling	35.00 to 36.00
Steel rails, less than 3 ft	30.50 to 31.00
Heavy melting steel	25.00 to 26.00
Frogs, switches and guards, cut apart	25.00 to 26.00
Shoveling steel	25.00 to 25.50
Low phos. heavy melting steel	28.00 to 29.00

Per Net Ton

Iron angles and splice bars	$31.00 to $32.00
Steel angle bars	25.50 to 26.00
Iron arch bars and transoms	31.25 to 32.25
Iron car axles	37.00 to 38.00
Steel car axles	34.50 to 35.00
No. 1 busheling	22.50 to 23.50
No. 2 busheling	16.00 to 16.50
Cut forge	24.50 to 25.00
Pipes and flues	20.50 to 21.00
No. 1 railroad wrought	27.50 to 28.50
No. 2 railroad wrought	24.50 to 25.00
Steel knuckles and couplers	26.50 to 27.00
Coil springs	28.50 to 29.00
No. 1 cast	39.50 to 40.00
Boiler punchings	26.50 to 27.00
Locomotive tires, smooth	26.50 to 27.00
Machine shop turnings	14.50 to 15.00
Cast borings	14.50 to 15.50
Stove plate	32.00 to 33.00
Grate bars	32.00 to 33.00
Brake shoes	26.50 to 27.50
Railroad malleable	30.25 to 31.25
Agricultural malleable	30.25 to 31.25
Country mixed	19.00 to 20.00

Boston

BOSTON, Feb. 3.

Pig Iron.—A conservative estimate of the amount of pig iron sold here the past week is 40,000 to 45,000 tons, the largest business booked before in any corresponding period in a long time. Most buying was for second quarter and last half delivery. One consumer bought 10,000 tons eastern Pennsylvania, Virginia and Buffalo, silicon 2.25 to 2.75, last half iron, and silicon 2.75 to 3.25, second quarter, at an average of $42 furnace for the former and $43 for the latter. Another customer took 3000 tons Buffalo, silicon 2.75 to 3.25, last half, at $43 furnace, and a Providence consumer 1500 tons, silicon 1.75 to 2.25, last half, at $40. Other Buffalo sales included 500, 300 and 100-ton lots, all on a $40 furnace base. Initial sales of Virginia Iron, Coal & Coke Co. at $40 furnace base were large, but later the market advanced to $42, and almost immediately the company withdrew from the market. Another Virginia furnace is still quoting on a $40.25 furnace base, having taken approximately 10,000 tons from local agents. Eight thousand tons eastern Pennsylvania second and third quarter iron, silicon 1.75 to 2.25, sold at $42.50 furnace, silicon 2.25 to 2.75, at $43.50, and silicon 2.75 to 3.25 at $45. Other Pennsylvania irons brought $43 base furnace, second quarter delivery, and $42 last half. Less than 2000 tons of Alabama iron were sold. The market on this iron is still $40 furnace. A small tonnage of high phosphorus Southern No. 2 X iron, first quarter, sold at $42.50 furnace. So far as known, no malleable has sold here since last reports. Two local houses sold small tonnages of Salesbury charcoal for nearby delivery at $62.25 furnace. Fifteen hundred tons Michigan charcoal, nearby delivery iron sold at $45 furnace. The market on such iron now is $50 furnace, but this particular furnace has withdrawn offerings. Reports of carload lots of sales of Buffalo iron, spot, at $50 furnace, are incorrect. Carload lots of eastern Pennsylvania spot iron have been sold at $47 furnace, and in one instance at $48, but the latter iron was special analysis and does not represent the true market. Other spot Pennsylvania iron, silicon 2.25 to 2.75, sold at $44.50, silicon 2.75 to 3.25 at $46.60 and $46.50 furnace. The spot market for any mark of iron is not far from $45 furnace for No. 2 X. It is expected that the embargo on New Haven Railroad through freight will be lifted at an early date. Delivered quotations follow:

East. Pa., silicon 2.25 to 2.75	$46.15 to	$47.15
East. Pa., silicon 1.75 to 2.25	44.90 to	45.90
Buffalo, silicon 2.25 to 2.75		45.15
Buffalo, silicon 1.75 to 2.25		43.90
Virginia, silicon 2.25 to 2.75	46.20 to	47.95
Virginia, silicon 1.75 to 2.25	44.95 to	46.70
*Alamaba, silicon 2.25 to 2.75		47.35
*Alabama, silicon 1.75 to 2.25		45.75

*Alongside Boston prices.

Finished Iron and Steel.—Two important fabricating mills, according to local representatives, have withdrawn from the market. Other mills are sold ahead six to nine months. Deliveries within three months cannot be obtained except at extra prices. Several thousand tons of shapes, February, March and April delivery, have been booked at $3.50 to $4 f.o.b. mill, and for special small tonnages, prompt delivery, more has been paid. The New England Structural Co., Boston, has been awarded 3000 tons of shapes for the Merchants' National Bank and 400 tons for Loew's Theater, Boston. The Berlin Construction Co., Berlin, Conn., has 100 tons for the Rhode Island Lace Works plant, Barrington, Conn., and the Boston Structural Steel Co., Cambridge, Mass., 210 tons for a brewery plant extension and 115 tons for the Atlantic Dyestuff jobs. The new Springfield, Mass., bridge calls for 2200 tons structural. Fay, Spofford & Thorndike, Boston, are drawing plans for a $300,000 Cohasset, Mass., Narrows bridge. The Westinghouse Electric & Mfg. Co. is about to close a contract for an East Springfield manufacturing building involving several hundred tons, and 200 tons for Building 42, Charlestown Navy Yard, will be let at an early date. The Boston Elevated Railway has covered its 1920 rail requirements, having bought 1300 tons from the Lorain Steel Co. and 100 tons from the Cambria Steel Co. Local plate quotations are strong, but no higher, and mills are cutting down on bookings. Thousands of tons of sheet are wanted, but mills are not accepting orders. Deliveries on bars are held up by lack of cars and embargoes. Cold-drawn specialties are obtainable, but at high prices owing to operating costs.

Jobbers quote: Steel bars, cold rolled rounds, $6 per 100 lb. base; squares, hexagons, flats, $6.50 base; soft steel, flats, rounds, squares, $4.25 base; concrete bars, plain round, square, $4.25; twisted squares, $4.75; structural steel under 3 in., $4.25; structural, 3 in. and over, $4; tire steel, $4.95; spring steel open hearth, $8.75; special, $12.75; toe calk steel, $6.25; steel hoops, $6.45; steel bands, $5.45; iron, refined, except as follows, $4.50 base; ½ in., 9/16 in. round, square, and 2¾ in. round, square and larger, $4.90 base; 7/16 in. round, square and smaller, $5.50 base; over 6 in. wide, $5.50 base; best refined iron, $5.50 base; Wayne iron, $7 base; band iron, $5.45; hoop iron, $6.45; Norway iron, $20; No. 10 blue annealed sheets, $5.55 base; No. 28 black sheets, $7.65; No. 28 galvanized sheets, $8.50; plates, $4.80 base.

Warehouse Business.—The strike by local freight handlers, coupled with embargoes on New England railroads, with snow, ice and cold weather, has virtually cut off jobbers' consignments from mills. Some firms are entirely out of small steel bars, and stocks of iron are exceptionally small. A lack of nut stock is holding up deliveries on stove bolts, and stocks of all bolts and nuts under ½ in. are badly broken. The spring demand for washers is being anticipated and local stocks are beginning to dwindle as a result. The demand for rivets continues active and prices are exceptionally strong. New Hampshire and Vermont maple sugar equipment manufacturers, unable to secure sheets from mills, are placing orders with jobbers. Warehouse stocks of plates and structural are badly broken. The nail situation continues serious. Galvanized nails have been advanced to a $10.50 store base.

Coke.—Business in coke during the past week has been confined to carload lots on a delivered basis of $11.90 per ton. The New England Coal & Coke Co., to protect itself, in accepting new business will insert a freight clause in its contracts, which provides for any advance made in freight rates.

Old Material.—Prices for heavy melting steel and wrought are unchanged owing to a lack of demand and the inability of yards to move material because of embargoes, local labor troubles at freight terminals, snow,

ice and cold weather. Quotations on other old material are materially higher, however. Local activity in the market has been confined largely to machinery cast. Sales of No. 1 cast, the largest reported being 300 tons, were made to Massachusetts foundries at $42 to $43 delivered. Boston foundries will not pay such prices, being able to secure small tonnages from little dealers at reductions. Almost no mixed and No. 2 cast has sold, consumers evidently being covered. One small lot of stove plate sold at $33.50 delivered, Massachusetts point. One car was taken by a New Hampshire consumer at 1½c. per pound. Steel mills have paid $15 to $16 shipping point for machine-shop turnings, and $24 delivered for heavy axle turnings. Pipe advanced $2 to $3 as the result of American Tube & Stamping Co., Bridgeport, Conn., entering the market, but sales are light. New England foundries paid $39 to $40 delivered for car wheels. A bid of $36 f.o.b. Boston, for export, for wagon tires is made. Yard quotations on old material follow:

No. 1 heavy melting steel	$22.50 to $23.00
No. 1 railroad wrought	27.00 to 28.00
No. 1 yard wrought	23.50 to 24.50
Wrought pipe (1 in. in diameter, over 2 ft. long)	20.00 to 21.00
Machine-shop turnings	15.00 to 16.00
Cast iron borings	17.50 to 18.50
Heavy axle turnings	20.00 to 21.00
Blast furnace borings and turnings	14.00 to 14.50
Forged scrap	16.00 to 17.00
Bundled skeleton	16.00 to 17.00
Steel car axles	27.00 to 28.00
Car wheels	36.00 to 37.00
Machinery cast	35.50 to 36.50
No. 2 cast	33.50 to 34.50
Stove plate	27.00 to 28.00
Railroad malleable	24.00 to 25.00
Rerolling rails	29.00 to 30.00

Cincinnati

CINCINNATI, Feb. 3.

Pig Iron.—The market is very active on all grades of foundry iron. One interest reports sales from all its offices averaging 25,000 tons daily during the past week. A large amount of this iron was disposed of in this territory, mostly in small lots. This is principally for second half delivery, and they have very little to offer for first half. All other dealers report business exceptionally brisk, and the aggregate amount of iron disposed of was considerably in excess of the previous week. Prices are very strong, southern Ohio foundry selling in one instance as high as $44.25 for the base grade on a tonnage of 4,000. This is considered a high price, as the majority of the sales have been made around $42 to $43 furnace. Southern iron is very firm at $40 furnace, and some furnaces are selling for both first and second half delivery at that figure. Others are taking on limited business for second half at the same figure, while at least one has advanced its price for second quarter to $42. This furnace, however, is reported to be out of the market. Some Virginia furnaces continue to book for second half at $40, though one has advanced to $42 during the week. A sale of 5,000 tons of Lake Superior charcoal iron is reported to a Michigan melter at $55. A nearby basic melter is in the market for his requirements for the next two months, but so far has not covered. Ohio silvery is active, and prices are holding firm at the recent advanced level. The Lawrence furnace of the Marting Iron & Steel Co. blew in on Saturday after having been banked for some time. Sales of basic and malleable in this territory have been negligible and quotations given are nominal.

Based on freight rates of $3.60 from Birmingham and $1.80 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base price)	$43.60
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	43.85 to $45.85
Ohio silvery, 8 per cent sil	54.30
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	41.80 to 42.80
Basic, Northern	39.80
Malleable	43.80

Coke.—The car situation shows no signs of improvement, and coke is in very short supply. This is particularly notable in southern Ohio, where furnaces are still being operated on a hand-to-mouth basis. The shortage of coke is also beginning to look serious for foundries in this city, as none of them has more than a three weeks' supply on hand, and extreme pressure is being brought to bear on ovens to get shipments through.

Finished Material.—Finished iron and steel products are still in great demand and large premiums are being freely offered for forward deliveries. It is reported that one mill, which has some tonnage to spare, has asked as high as 100 per cent over the March 31 price for plates. Deliveries of sheets are becoming worse, if such a thing be possible. A nearby mill reports that last week over 500 of its employees were laid up with influenza. What sheets manage to come through on contracts placed last fall are being quoted by local jobbers at 5.50c. for black and 7c. for galvanized. It is reported that a broker disposed of a carload of galvanized sheets last week at 11.50c. Jobbers' usual prices are:

Steel bars, 4c.; structural shapes, 4.10c.; bar iron, 4.25c.; No. 10 blue annealed, 5.48c.

Old Material.—Scrap is becoming more active, and prices generally have been advanced. On several lines $3 a ton has been added, notably relaying rails, rerolling steel rails, steel rails for melting, railroad wrought, burnt scrap and old car wheels. A feature of the week was the purchase of the electric railway known as the "swing line" by two well known scrap dealers, at a price said to be $340,000, though this has not been confirmed.

Per Gross Ton

Bundled sheet	$17.00 to $18.00
Old iron rails	27.00 to 28.00
Relaying rails, 50 lb. and up	45.00 to 46.00
Rerolling steel rails	31.00 to 32.00
Heavy melting steel	23.00 to 24.00
Steel rails for melting	25.00 to 26.00
Car wheels	29.00 to 30.00
No. 1 railroad wrought	26.00 to 27.00

Per Net Ton

Cast borings	$14.00 to $14.50
Steel turnings	12.50 to 13.00
Railroad cast	30.00 to 31.00
No. 1 machinery	33.00 to 34.00
Burnt scrap	20.00 to 21.00
Iron axles	29.50 to 30.00
Locomotive tires (smooth inside)	23.50 to 24.50
Pipes and flues	17.00 to 17.50
Malleable cast	23.00 to 23.50
Railroad tank and sheet	16.00 to 16.50

Buffalo

BUFFALO, Feb. 3.

Pig Iron.—An avalanche of inquiry has continued to pour in during the past week from all sections and very large tonnage has been booked, aggregating over 200,000, almost entirely foundry grades, for last half delivery. Some tonnages of basic have been sold, but no malleable; and it has been one of the heaviest booking weeks in the history of the district. There is one inquiry for 10,000 tons of basic and one of 1,000 tons of malleable still before the market, as well as large tonnages of foundry grades. Most consumers, of all grades, have buoyant views and they have been eagerly purchasing to cover their wants for the last half of the year at the current level of prices. All the furnace interests of the district, with one exception, have announced that they are now out of the market for the present, being largely sold up. The interest excepted has some untaken last half capacity, but is not soliciting business, and producers are now refiguring costs before taking on any further business, believing that costs will soon be greatly increased and that any further tonnages they may have to dispose of should be at advanced prices. Most of the sales of the week were at $40 base to $45 for higher silicon; but in the last day or two prices stiffened at least $1 per ton, and one interest that has been a very heavy seller in the last few weeks states it will not accept less than $45 for No. 2 plain; $46.25 for No. 2X; $48 for No. 1 and $50 for 3.25 to 3.75 silicon. It had opportunity, it states, of taking on additional bookings for 40,000 to 50,000 tons, had it the capacity and inclination to do so, but it is now refusing orders, preferring to hold such untaken capacity as it has for old customers, as

it expects there will be an acute shortage of iron later. The price schedule is as follows for such tonnages as are obtainable f.o.b. furnace, Buffalo:

No. 1 foundry, 2.75 to 3.25 sil.	$44.00 to $48.00
No. 2X, 2.25 to 2.75 sil.	44.25 to 46.25
No. 2 plain, 1.75 to 2.25 sil.	41.00 to 45.00
Malleable, silicon not over 2.25 nom.	44.25
Basic	43.00
Lake Superior charcoal, according to grades, f.o.b. Buffalo	58.00 to 60.00

Finished Iron and Steel.—The principal concern of shippers now appears to be the securing of cars in which to forward material, and although one or two mills report a little improvement over last week, most of them state they are getting only about one-fifth of the number they need. Demand for all types of material is heavy and pressure for shapes and plates is increasing over the lighter lines, such as bars and sheets, although there is no falling off in demand for these lighter commodities. The call for cold rolled finished steel is very large and one of the principal sellers has entirely withdrawn from the market and buyers are experiencing difficulty in securing their requirements. The advancing trend in prices continues for all steel products. An order for 10,000 tons of rails for the Wabash Railroad has been awarded to the Lackawanna Steel Co. The John W. Cowper Co., Buffalo, has closed the general contract for a three-story top addition to the Lawrence Hotel, Erie, Pa., for which the Erie Steel Construction Co. of Erie will furnish the 200 tons of structural steel required. The Cowper company has also closed the contract for additions to the plant at Buffalo purchased by the Rome Wire Works and to be occupied by it, requiring 250 tons of steel. The Ferguson Steel & Iron Co., Buffalo, will fabricate and erect 350 tons of steel for boiler house for the Eastman Kodak Co., Rochester. The Dunlop Rubber Co. of America, 19 West Forty-fourth Street, New York, is taking bids for construction of its plant on the Niagara River, Buffalo, to be comprised of 14 buildings, the estimated cost of which is approximately $14,000,000 with equipment.

Old Material.—There is strong demand for every item on the scrap list from both local and outside district consumers, and many grades command higher prices than a week ago. The foundry scraps, such as machinery cast, stove plate, are very scarce and some of the smaller users have to pay as high as $40 per ton to obtain such grades. The extremely cold weather of the past week has interfered with the production of scrap at some plants, reducing it to 75 per cent of normal. The shortage of cars for loading is increasingly large and becoming very acute: it is likely to present a very serious problem in a short time. The latter situation for handling and loading is also getting worse. We quote dealers' asking prices, per gross ton, f.o.b., Buffalo, as follows:

Heavy melting steel, regular grades	$27.00 to $28.00
Low phos., 0.04 and under	32.00 to 33.00
No. 1 railroad wrought	31.00 to 32.00
No. 1 machinery cast	38.00 to 39.00
Iron axles	40.00
Steel axles	40.00
Car wheels	37.00 to 38.00
Railroad malleable	31.00 to 32.00
Machine-shop turnings	17.50 to 18.00
Heavy axle turnings	21.00 to 22.00
Clean cast borings	20.00 to 21.00
Iron rail	30.00 to 31.00
Locomotive grate bars	24.00 to 25.00
Stove plate	29.00 to 30.00
Wrought pipe	20.00 to 21.00
No. 1 busheling	22.00 to 23.00
Bundled sheet stamping	19.00 to 20.00

Birmingham

BIRMINGHAM, ALA., Feb. 2.

Pig Iron.—On a basis of $40 for foundry, 1.75 to 2.25 silicon, Birmingham district iron makers have sold a large tonnage through the first half and not a little for third quarter delivery. One interest has booked a small amount through the second half. A one-stack interest is the only one which claims not to have entered the second quarter. All makers have open books and tonnage is placed every day. There is not much first half capacity left and third quarter bids fair to be well cared for in the near future. The leading interest is still on a basis of $38 through the third quarter, but its tonnage for the general market is extremely limited at present productive activity, hence the level of $40 strictly adhered to by others is not affected and the Birmingham market is properly classified in the $40 column. One large interest is understood to have booked as much as 35,000 tons recently for delivery throughout the year, the major portion for first half. Another large interest, which has booked heavy tonnages, is understood to be contemplating an advance of $1 a ton, but that depends on advice of selling agencies. General disposition is to halt at the present level so as not to endanger a good thing. The leading interest, by announcing maintenance of the $38 level, leads in the steadying influence. The car service is again poor, and some makers are piling iron again and others are restrained from a greater manufacturing activity. We quote per gross ton, f.o.b. Birmingham district furnaces, as follows:

Foundry, sil. 1.75 to 2.25	$40.00
Basic	39.00
Charcoal	50.00

Coal and Coke.—Coal production in Alabama has reached a point in excess of that of the past three years, and indications point to continuous heavy output. The coke demand is exceedingly strong and all good foundry is taken at the maximum Government prices, $9.30 to $10.30.

Cast-Iron Pipe.—The new high levels for pipe have not affected the demand. Edgefield, S. C.; Ripley and Greenville, Tenn., and numerous other southern localities have placed belated orders for water pipe. In spite of the increased active capacity of sanitary pipe plants, demand exceeds manufacturing capacity, and practically all are booked 60 days ahead, which is their limit.

Old Material.—The market is active and prices firm, with advancing tendencies. Stove plate and No. 1 cast move out of yards almost as soon as accumulated, and all steel grades are also on the active list. Stocks are running low. We quote per gross ton, f.o.b. Birmingham district yards, prices to consumers, as follows:

Steel rails	$22.00 to $22.50
No. 1 heavy steel	22.50 to 23.00
Cast iron borings	14.00 to 15.00
Machine-shop turnings	14.00 to 15.00
Stove plate	25.00 to 26.00
No. 1 cast	28.00 to 29.00
Car wheels	28.00 to 29.00
Tramcar wheels	27.00 to 28.00
Steel axles	29.00 to 30.00
No. 1 wrought	24.00 to 25.00

New York

NEW YORK, Feb. 3.

Pig Iron.—Last week was one of great activity in foundry and malleable irons. One firm sold a large tonnage following unusually heavy tonnages in January, when its sales amounted to 50 per cent of the entire sales of the firm for all of last year. After this heavy buying there has come a lull and this is fortunate, as it is evident that there was some speculative buying with a tendency to force prices entirely too high. Buying has been very largely for the last half, and very little tonnage is available for first half. Apparently consumers are willing to rest for a while and furnaces are not disposed to push sales. A foundry is asking for off iron in the place of No. 1 cast scrap, which it has been using, and which is very scarce at from $40 to $42, delivered. The leading Virginia interest, after selling a considerable tonnage at $40, has withdrawn from the market. A prominent eastern Pennsylvania furnace is also out of the market. For prompt delivery as high as $45, furnace, has been obtained for No. 2 X. The usual quotation for last half is $43, furnace. Inquiries from foreign sources are receiving scant attention on account of the very active demand from domestic melters. There is embargo on shipments of coal and coke, practically all through New England and on the New York Central. We quote for delivery in New York, last half of the year, as follows:

No. 1 foundry, sil. 2.75 to 3.25	$47.05
No. 2X, sil. 2.25 to 2.75	46.05
No. 2 plain, sil. 1.75 to 2.25	44.80
No. 2X, Virginia, sil. 2.25 to 2.75	$45.40 to 46.40

Ferroalloys.—The ferromanganese market is quiet but very strong. Alloy for spot delivery has sold as high as $185, delivered, one sale of 50 tons at this level being noted. Very little domestic ferromanganese seems to be available for first half delivery and producers are asking not less than $160 for last half, at which level some sales are reported but not confirmed. In the last week around 4000 tons of British ferromanganese has been sold for delivery from April 1, most of it at $145, seaboard, the remainder at $150. So far as can be ascertained very little British alloy now remains to be offered. According to the blast furnace reports of THE IRON AGE for January, the production of domestic ferromanganese is approximately 18,000 gross tons. The spiegeleisen market is exceedingly strong, sales having been made at $57, furnace, one seller offering as low as $55. Production in January was approximately 5900 tons. Ferrosilicon, 50 per cent, is quiet but strong at $80 per ton, delivered. Quotations for ferrotungsten are nominal at about $1 per lb. of contained tungsten, with transactions probably a matter of negotiation for open market quotations are hard to ascertain. Ferrochromium, 60 to 70 per cent, carload lots, is quoted at 19c. to 20c. per lb. of contained chromium, with the carbon ranging from 6 to 8 per cent. For less than carload lots 1c. per lb. higher is asked, and for the alloy in which the carbon ranges from 4 to 6 per cent an increase of 1c. per lb. over the foregoing values is the rule. Imports are expanding rapidly, having been over 555,000 lb. to Oct. 1, 1919, all of this in the third quarter. Ferrovanadium is quoted at $5.50 to $6 per lb. of contained vanadium in wholesale lots for early delivery. Ferrocarbontitanium, 15 to 18 per cent, is selling at $200 per net ton in carload lots, at $220 per ton in lots between one ton and a carload, and at $250 per ton in lots less than a ton, f.o.b. Suspension Bridge, N. Y.

Warehouse Business.—Stocks are still worse depleted and rail deliveries from mill drag more than ever. Dealers find themselves more and more compelled to cater to their established trade. The demand on warehouses grows more strenuous, but jobbers generally see a necessity for increased caution in stocking up. One large interest has advanced the price on blue annealed, No. 10 gage, to 5.32c. Sales of black sheets are now made at from 7c. to 9c., an advance of 50c. per 100 lb. on the minimum figure. Galvanized sheets have been advanced 50c. per 100 lb., selling now from 8.25c. to 10c. One local interest has advanced coke tin plate 50c. per 100 lb., making $1 per 100 lb. advance within two weeks. Spring steel stocks are low, and there are almost no shipments. On both this material and cold-drawn steel incoming shipments are practically sold before unloading. Screw stock is quoted at 6c. to 6.50c., base. Sizes ⅝ and ½ in. have been sold at from 9 to 10c. the past week, but all sizes 1 in. and smaller are virtually wiped out, and there is little from 1 to 1½ in. Cold-rolled strip steel is quoted at 6c. base, but one firm has sold 0.042 and lighter at 10c. A leading interest has issued new discounts on boiler tubes, plus 22 for lapwelded 1¾ to 2 in. and for seamless 27c. per ft. for 2 in. No. 13 B. W. G. We quote out of store prices: Steel bars, 3.52c. to 4.25c.; structural shapes, 3.47c. to 3.90c.; plates, 3.67c. to 4.25c.; No. 10 blue annealed sheets, 5.07c. to 5.80c.; 28-gage box annealed black, 7c. to 9c.; 28-gage galvanized, 8.25c. to 10c.

Finished Iron and Steel.—Scarcity of steel is being more and more seriously felt by consumers. Car builders, for example, are having difficulty in getting sufficient plates for ordinary car repairs. One large car builder is quoting six months' delivery on car repair work on this account. If the railroads remain under Government control for another six months after March 1, it is regarded as likely that the Railroad Administration may be obliged to resort to commandeering, as was done last week on rails, in order to keep the railroad equipment in service. Prices paid for such steel as can be bought for early delivery continue to show an upward trend. An automobile manufacturer has bought 11,000 tons of soft steel bars from an Eastern mill, paying 4.25c., base, Pittsburgh, for 9000 tons and 4.50c., base, Pittsburgh, for 2000 tons. Deliveries are to begin soon and continue through June. Billets, when obtainable, also command high prices, 1800 tons of open-hearth rerolling billets having been sold in the East at $60, Pittsburgh, and a smaller tonnage of forging billets brought $70, Pittsburgh. Even rejected billets have been sold at correspondingly high prices. A tonnage of 2¼ x 2¼-in. billets was sold at $58, Pittsburgh, with $2 extra for carbon. A few of the smaller mills are taking orders for small lots of plates at around 4c., Pittsburgh, with delivery in two or three months. An Eastern mill is quoting 3.75c., Pittsburgh, for universals and 4c. for sheared plates, but is taking nothing but very desirable tonnage from regular customers. Small plates, such as sheared ends, which ordinarily are cut up for scrap, are being sold at the top prices, and there is a good demand for this material, particularly for repair work. Hot and cold-rolled strip steel are in good demand, and mills which are accepting business are doing so only with a condition that the price is to be named later. The leading interest is quoting 5.65c., Pittsburgh, on cold rolled, but has none to sell. Other makers have recently gotten 7c. to 8c., Pittsburgh. Car shortage is still a serious factor. The Great Northern Railroad will close bids this week on 1000 ore cars. The Belgian Government is trying to conclude negotiations for the purchase of 18,800 freight cars. The structural steel market is not at the moment very active, but a large number of projects are being figured on. Included are piers for the Cunard Line at Weehawken, N. J., which will require several thousand tons of steel; a Christian Science church and office building, Madison avenue and Forty-third Street, New York, about 3000 tons; office building at Madison Avenue and Forty-second Street, New York, 5000 to 6000 tons; co-operative apartment building in Park Avenue, New York, 2000 tons; two buildings on Fifth Avenue, projected by the George Backer Construction Co., a total of about 10,000 tons; two buildings in Seventh Avenue or nearby for garment industries, 15,000 tons; an office building for the Munson Line, Beaver Street, New York, 1500 tons, and the new Ritz-Carlton Hotel at Atlantic City, N. J. Three oil tanks for the Hartford Electric Light Co., Hartford, Conn., will take 700 tons. The American Bridge Co. has taken a contract for a smelting plant at Canyon City, Col., 1100 tons.

We quote for mill shipment, New York, as follows: Soft steel bars, 2.62c. to 4.52c.; shapes, 2.72c. to 2.82c.; plates, 2.92c. to 4.27c., the minimum prices being for indefinite delivery and the higher prices for the first quarter; bar iron, flats, wider than 6 in., 4.07c.; ⅜ and 7/16 in., round and square, 4.47c.; light rounds, squares and flats, 4.77c., and other sizes, 3.77c.

Cast-Iron Pipe.—Another raise has been made in price, effective Feb. 1, this time amounting to $3 a ton, being the third marking up since early in December, and making the total raise since that time $12. The first change amounted to $4, the second $5 a ton, effective Jan. 1. The machine shops in connection with pipe makers are unusually busy, due to the large orders for flange pipe from oil companies. It is therefore difficult to assure deliveries in advance of July and August. It is reported that the inquiry for 22,000 tons for South America, announced last week, has not yet been placed. We now quote 6 in. and heavier at $70.30, New York; 4 in., $73.30, with $2 additional for Class A and gas pipe.

Old Material.—There is now a market for three distinct grades of heavy melting steel affecting this district, the best grade going to the Pittsburgh district, and the second and third grades to eastern Pennsylvania, the prices quoted here representing an average, or the medium grade. The range, New York, is from $21 to $24. The week has seen another movement upward, and we have marked up prices on 18 items. A New York broker has raised buying prices on 13 items. Most conspicuous in their advance have been car wheels and No. 1 cast, both of which have advanced about $2. No. 1 cast has been sold by a New York broker for $42, delivered nearby. In spite of the advance, some of the leading brokers admit dullness as far as quantity of transactions is concerned. The Standard Iron & Steel Co., New Haven, Conn., has just

bought 2000 tons of rails, heavy melting steel and bundled skeleton, located at the Penn Seaboard Corporation, New Haven, Conn. Buying prices per gross ton, New York, follow:

Heavy melting steel	$22.50 to $23.50
Rerolling rails	32.00 to 33.00
Relaying rails, nominal	47.00 to 48.00
Steel car axles	33.00 to 34.00
Iron car axles	44.00 to 44.50
No. 1 railroad wrought	33.00 to 34.00
Wrought iron track	25.00 to 25.50
Forge fire	17.00 to 18.00
No. 1 yard wrought, long	26.00 to 26.50
Light iron	7.00 to 8.00
Cast borings (clean)	20.00 to 21.00
Machine-shop turnings	16.50 to 17.00
Mixed borings and turnings	15.50 to 16.00
Iron and steel pipe (1 in. min. diam., not under 2 ft. long)	21.00 to 21.50
Stove plate	27.00 to 28.00
Locomotive grate bars	27.00 to 28.00
Malleable cast (railroad)	27.00 to 27.50
Old car wheels	39.00 to 40.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton:

No. 1 machinery cast	$40.00 to $41.00
No. 1 heavy cast (columns, building materials, etc.) cupola size	38.00 to 39.00
No. 1 heavy cast, not cupola size	29.00 to 30.00
No. 2 cast (radiators, cast boilers, etc.)	29.00 to 30.00

Philadelphia

PHILADELPHIA, Feb. 3.

The shortage of railroad cars is having a serious effect upon operation of blast furnaces and steel plants. Some blast furnaces have been obliged to slow down operations owing to the lack of coke. It has been impossible also to get enough cars to ship pig iron out and metal is being piled. The same situation exists at several steel plants, which are short of both coal and coke. One Eastern mill with 10 open-hearth furnaces was obliged to put out all but two owing to an insufficiency of gas coal. Storage yards at steel plants are choked with material which cannot be shipped out as rapidly as rolled. An Eastern plant has 30,000 tons of structural shapes alone in its storage yard and has been obliged to slow down operations of its shape mills. It is stated that one large steel company has within the past week or two shipped only about 25 per cent of its output. Foundries also are affected and one- or two-day shut-downs, due to lack of coke, have become frequent. Car distribution at various Eastern shipping points has been down to 15 to 20 per cent of normal on several days within the past week or two. Shipments to New England from this territory are embargoed owing to congestion of freight in that section of the country, the result of recent heavy snowfall. Further railroad embargoes are expected as the only remedy of the situation, as there is no prospect of any immediate increase in the car supply by the addition of new cars or repairing of old ones. The shortage of plates is delaying work on repairs at car shops.

Under these conditions, prices for all materials show further advances. The advance of $1 a ton on Lake Superior ore has stiffened the pig iron market as this will result in an increase of $2 a ton in the cost of making iron. A possibility of $10 coke when Government control is withdrawn and an expectation that railroad freight rates will be considerably advanced when the roads are returned to private operation are also important factors in consideration of future business. Several Eastern pig iron interests have withdrawn from the market for first half and are selling only for second half.

The Eastern plate market is strong at 4c., Pittsburgh, and sellers state that 4.25c. or higher could be obtained for prompt delivery, which mills are unable to promise. Bar iron has been advanced $10 a ton. The scrap market is stronger and some grades of scrap, notably carwheels and No. 1 cast, are scarce.

A peculiar situation has arisen between the United States Shipping Board and some of the shipyards which took over Government contracts. These shipyards relieved the Government of completing ships which were on the ways, the Shipping Board agreeing to furnish the yards with steel. This it now finds difficult to do and several mills have had requests to reinstate Shipping Board orders placed in 1917 and 1918 at 3c. for shapes and 3.25c. for plates. These mills, with their order books already filled to overflowing, are not inclined to accept reinstatement.

Pig Iron.—Blast furnaces are having difficulty in keeping up production owing to lack of coke. Several furnaces have been obliged to slow down and are casting considerably less iron than under normal conditions. After the iron is made there is great difficulty in shipping owing to shortage of cars. The principal work of pig iron sales offices now is to answer complaints of customers who are in distress because they are not getting their iron. Shipments of one large Eastern furnace interest are about one-fifth to one-quarter of normal. Most of the Eastern furnaces are out of the market for first half. The tendency of prices is higher. One company, which was selling second half iron at $1 per ton less than for first half, has advanced the second half price $1 and is out of the market for first half. There is considerable inquiry for second half and most of the selling is for that delivery. The Worthington Pump & Machinery Corporation, New York, has closed for about 12,000 tons of foundry iron for its various plants for second half. A Virginia furnace has sold 40,000 tons of foundry iron for delivery over the remainder of the year on the basis of $40.25 for 1.75 to 2.25 per cent silicon and is now out of the market. Other Virginia makers have advanced to the basis of $42, furnace; $1.25 extra for No. 2 X and $3 above base for No. 1 grade. One of the leading Buffalo interests is out of the market for the remainder of the year. Consumers seem to be fairly well taken care of for first half, but inability to get shipments is likely to stimulate a larger demand for spot iron. Predictions are made that foundry iron will go still higher within a week. Basic pig iron has been sold at an advance over last reported sales. One lot of 1000 tons to a New Jersey consumer and another lot of 3000 tons were sold at $40, furnace, equivalent to $41.40, delivered Eastern Pennsylvania. There are several inquiries for standard low phosphorus iron for second half, one of 2000 tons. Last sales were made at $49, furnace, but present quotations are $50 or higher. Copper bearing iron is quoted at $45, furnace. Malleable iron is scarce and is quoted at $43.25, f.o.b. Hanging Rock furnace.

The following quotations are for iron delivered in consumers' yards in Philadelphia or vicinity, except those for low phosphorus iron, which are f.o.b. furnace:

Eastern Pa., No. 2X, 2.25 to 2.75 sil.	$44.35 to $45.35
East. Pa., No. 2 plain, 1.75 to 2.25 sil.	43.10 to 44.10
Virginia No. 2 plain, 1.75 to 2.25 sil.	46.10
Virginia No. 2X, 2.25 to 2.75 sil.	47.35
Basic deliv. Eastern Pa.	41.40
Gray forge	40.50 to 41.50
Standard low phos. (f.o.b. furnace)	48.00 to 49.00
Malleable	45.15
Copper bearing low phos. (f.o.b. furnace)	45.00

Coke.—The coke situation is assuming a very serious aspect. Both furnaces and foundries are suffering from insufficient shipments, due to car shortage. Very little coke is being sold at the Government control prices of $6 for furnace coke and $7 for foundry grade. Both coal and coke are expected to go higher when Government control ends, and predictions of $10 and $12 coke are common.

Ferroalloys.—Ferromanganese is hard to find for first half delivery. There is little inquiry for second half. Quotations are generally $160, delivered, for domestic and $150, seaboard, for English. Spiegeleisen is higher at $55 to $57.50, furnace, with little available for early delivery.

Semi-Finished Steel.—There is a demand for ingots from Central Western mills which haven't enough steel. For ordinary soft steel ingots, $52, shipping point, has been offered, and up to $60 has been offered for special quality. With open-hearth rerolling billets selling at $55 to $60, Pittsburgh, and forging billets at $65 to $70, Pittsburgh, these offers for ingots have not proved attractive.

Plates.—One Eastern mill has opened its books for a limited tonnage of plates for delivery in second or third quarter at 4c., Pittsburgh, but will make a selection of tonnages. Otherwise, there is little, if any, plate tonnage available for early delivery. Some mills

have not sold up full for second quarter, but are not anxious to sell, believing prices will go higher. Consumers who were covered for first quarter have come into the market for further supplies, but are apt to be disappointed. The Eastern market is now on the basis of 4c. to 4.25c., Pittsburgh, for sheared plates, with universals quoted at 3.75c.

Structural Material.—Eastern makers of shapes are all virtually out of the market, or are taking only small lots forced upon them by regular customers. We quote 3.75c., Philadelphia, for large shapes and 4c., Philadelphia, for small shapes.

Bars.—Leading makers of bar iron have advanced prices $10 a ton, effective to-day (Tuesday). The new prices are 4c. per lb. for rounds and squares ½ in. in diameter and larger, and flats ¼ in. thick and thicker; 4.70c. for rounds and squares ⅜ in. and 7/16 in.; 5c. for ⅛-in. and 3/16-in. flats, and 5½c. for ¼-in. and 5/16-in. rounds and squares, all f.o.b. Pittsburgh, freight to Philadelphia 25c. per 100 lb. Steel bars are not easily obtainable, but on such lots as are being sold the market is around 4c., Pittsburgh, though one Eastern mill names a price of 2.70c., with indefinite delivery, probably third quarter.

Sheets.—Blue annealed sheets have been sold in small lots from mill the past week on the basis of 4.55c. to 4.80c., Pittsburgh, for No. 10 gage.

Old Material.—Scarcity of foundry pig iron due to car shortage, has brought many foundries into the market for scrap. No. 1 cast is in good demand and a local dealer is offering $40, f.o.b. cars, Philadelphia or nearby, for available supplies. For carwheels, $40 to $41 is offered. Cast borings, machine-shop turnings, forge fire and skeleton and stove plates are also in demand, with higher prices ruling. On transactions between dealers $26.50 delivered, Eastern point, has been paid for heavy melting steel. Steel scrap is being shipped to the central territory to apply on orders at $29, delivered. We quote for delivery at Eastern Pennsylvania consuming points, as follows:

No. 1 heavy melting steel	$26.50
Steel rails rerolling	$36.00 to 38.00
No. 1 low phos., heavy, 0.04 and under	32.00 to 34.00
Car wheels	40.00 to 45.00
No. 1 railroad wrought	35.00 to 36.00
No. 1 yard wrought	30.00 to 31.00
No. 1 forge fire	21.00 to 22.00
Bundled skeleton	21.00 to 22.00
No. 1 busheling	24.00 to 25.00
No. 2 busheling	18.50 to 19.50
Turnings (short shoveling grade for blast furnace use)	19.00 to 20.00
Mixed borings and turnings (for blast furnace use)	18.00 to 18.50
Machine-shop turnings (for rolling mill and steel works use)	21.00 to 22.00
Heavy axle turnings (or equivalent)	22.00 to 23.00
Cast borings (for rolling mills)	24.00 to 25.00
Cast borings (for chemical plant)	25.00 to 27.00
No. 1 cast	41.00 to 42.00
Railroad grate bars	31.00 to 32.00
Stove plate	29.00 to 30.00
Railroad malleable	29.00 to 30.00
Wrought iron and soft steel pipes and tubes (new specifications)	25.00 to 26.00
Iron car axles	45.00 to 46.00
Steel car axles (f.a.s. New York for export)	39.00 to 40.00

St. Louis

ST. LOUIS, Feb. 2.

Pig Iron.—The buying of pig iron for the last half delivery has been heavy during the past week, furnace representatives having been given instructions to accept orders for that period. The quantities bought ranged from 100 to 1500 tons individually, with a total for the week of approximately 25,000 tons. Some small lots of basic were included in the buying as well as malleable and foundry iron. The buying included Southern, Northern and local furnace iron, with most of the Southern furnaces taking the orders at $42, Birmingham, although a few are understood to have taken some on at $40. Northern iron was sold at $42, Ironton, while the price of the local furnace was an equivalent of the Birmingham basis. On a little prompt shipment selling the price was $43 to $43.50 per ton, Birmingham, but very little was available.

Coke.—No business is being transacted in coke other than that actually necessary to take care of old customers' needs. This is due to the continued indisposition of the ovens to do any more business than has to be done under the Government's regulations as to price.

Finished Iron and Steel.—Mill representatives during the past week were very generally instructed to be particularly careful about taking orders, and in consequence very little business was done. Quotations were either refused or diplomatically avoided, the cause being understood to be the shortage of motive power for the handling of raw material to the mills, thus shortening the production. Specifications against contracts were received, but without promises as to delivery. Warehouse business continued very good on the material available for delivery, but no improvement was noted in material not in stock or behind in delivery to warehouse.

For stock out of warehouse we quote as follows: Soft steel bars, 3.44c.; iron bars, 4.09c.; structural material, 3.54c.; tank plates, 3.74c.; No. 10 blue annealed sheets, 5.34c.; No. 28 black sheets, cold rolled, one pass, 6.60c.; No. 28 galvanized black sheet gage, 8.10c.

Old Material.—After the excitement of the preceding week scrap dealers seemed to pause to catch their breath, but while there was relatively little business done, there was no disposition to weaken on prices. Consumers are taking freely on their contracts and no embargoes are reported except in such cases as physical conditions compel for a short period. Being the last week in the month, no lists appeared from the railroads. We quote dealers' prices, f.o.b. customers' works, St. Louis industrial district, as follows:

Old iron rails	$31.50 to $32.00
Old steel rails, rerolling	34.50 to 35.00
Old steel rails, less than 3 ft.	30.50 to 31.00
Relaying rails, standard sections, subject to inspection	45.00 to 50.00
Old car wheels	33.50 to 34.50
No. 1 railroad heavy melting steel	26.50 to 27.00
Heavy shoveling steel	23.50 to 24.00
Ordinary shoveling steel	23.00 to 23.50
Frogs, switches and guards, cut apart	27.00 to 27.50
Ordinary bundled sheets	16.00 to 16.50
Per Net Ton	
Heavy axle and tire turnings	19.00 to 19.50
Iron angle bars	28.00 to 28.50
Steel angle bars	24.50 to 25.00
Iron car axles	38.00 to 38.50
Steel car axles	35.00 to 35.50
Wrought arch bars and transoms	33.00 to 33.50
No. 1 railroad wrought	26.50 to 27.00
No. 2 railroad wrought	25.00 to 25.50
Railroad springs	24.50 to 25.00
Steel couplers and knuckles	25.50 to 26.00
Locomotive tires, 42 in. and over, smooth inside	26.00 to 26.50
No. 1 dealers' forge	23.00 to 23.50
Cast iron borings	15.00 to 15.50
No. 1 busheling	24.00 to 24.50
No. 1 boiler, cut to sheets and rings	19.00 to 19.50
No. 1 railroad cast	34.50 to 35.00
Stove plate and light cast	30.50 to 31.00
Railroad malleable	26.50 to 27.00
Agricultural malleable	26.00 to 26.50
Pipes and flues	20.50 to 21.00
Heavy railroad sheet and tank	20.00 to 20.50
Railroad grate bars	30.00
Machine-shop turnings	15.50 to 16.00
Country mixed	22.50 to 23.00
Uncut railroad mixed	23.50 to 24.00
Horseshoes	24.00 to 24.50

Cleveland

CLEVELAND, Feb. 3.

Iron Ore.—Lake Superior ore prices for the season were established Monday at $1 a ton advance over last year's prices and a very heavy buying movement is now under way. The new prices are as follows, delivered, lower lake ports: Old range Bessemer, $7.45; old range non-Bessemer, $6.70; Mesaba Bessemer, $7.20; Mesaba non-Bessemer, $6.55. Salesmen of practically all the ore firms are out making sales and converting reservations previously made into contracts and a very large tonnage was booked in the fore part of the week. Sales have been largely in high grade basic and foundry iron ores and some of the most desirable ores have been sold up and withdrawn from the market. There has been little activity so far in Bessemer ores. There was some objection to the advance in price, particularly in the

East, where some consumers thought 50c. to 75c. advance would be sufficient, but considerable tonnage has been sold in the East. Sellers will absorb any advance in Lake carrying charges, so that if the vessel rates are advanced 20c. per ton, or to $1 from the head of Lake Superior, the rate that prevailed in 1918, as is expected, the ore sellers will have a net advance of only 80c. per ton. However, any changes in the rail rates from mines to the upper lake docks will affect the consumers. Mining companies have felt that ore prices have been too low for the past three years and owing to the high operating costs a number of underground mines were operated at a loss last year. We now quote delivered lower lake ports:

Old range Bessemer, $7.45; old range non-Bessemer, $6.70; Mesaba Bessemer, $7.20; Mesaba non-Bessemer, $6.55.

Pig Iron.—Sales of pig iron continued heavy during the week, and a great deal of inquiry is still coming out. Three leading sellers booked orders during the week for foundry and malleable iron well in excess of 100,000 tons, all for the last half delivery, and have placed so much business on their books during the past two or three weeks that they have either called a halt on sales temporarily or will take on only limited tonnages until they make a more definite decision as to the future of selling policies. A number of producers have sold from 50 to 70 per cent of their output for the last half delivery. Prices are held at recent levels, sales being at $40 for 1.75 to 2.25 silicon foundry iron. One Valley interest is asking $42.25 and a Southern and Ohio furnace $42.50, furnace, for foundry iron for the last half, but no sales are reported at these prices and several leading sellers are trying to hold the price down to $40. Sales include many lots from 1000 to 5000 tons. The car shortage is preventing some furnaces from shipping their entire daily melt. Basic iron has quieted down, although two 10,000-ton inquiries have come out, one from Erie for the second quarter and the other from West Virginia for the last half. The price of basic iron remains unchanged at $40, although a Valley furnace has sold two carloads for prompt shipment at $41. A central Ohio foundry has taken 5000 tons of malleable iron for the last half. Apparently the furnaces of the Central Western territory will be unable to supply the heavy requirements of the gray iron and malleable foundries in the territory, particularly in Michigan. An Indiana implement manufacturer inquired for 8000 tons of iron but was able to place only 2500 tons with his usual source of supply. That consumers are unable to place orders with nearby furnaces is indicated by inquiries that have reached a Cleveland producer, one for 4000 tons of foundry iron from a Wisconsin pump manufacturer and another for 3600 tons from an Indiana melter. The demand for spot foundry iron has fallen off, but a few sales are reported at $42.50. There is a great deal of activity in Southern iron for the last half, sales being made for that delivery by Tennessee furnaces at $40, Birmingham, for 1.75 to 2.25 silicon iron. This demand is coming largely from stove and jobbing foundries. A Cleveland stove manufacturer has taken 2000 tons and several other local sales in lots up to 1000 tons are reported. Other sales include two 1000 tons in Erie and 1400 tons in Pittsburgh. Considerable Ohio silvery iron is also being booked for the last half, but makers have taken on so much tonnage that they are not inclined to accept further orders except in very limited amounts. We quote delivered Cleveland as follows:

Basic	$40.40
Northern No. 2 foundry, sil. 1.75 to 2.25	40.40
Southern foundry, sil. 2.25 to 2.75	$46.25 to 46.60
Gray forge	39.40
Ohio silvery, sil. 8 per cent	54.90
Standard low phos., Valley furnace	45.00 to 46.00

Finished Iron and Steel.—The steel situation is daily growing tighter. Demand is very heavy and consumers are finding it increasingly difficult to place orders. Some consumers are only taking specifications on existing contracts. We note the sale of 3000 tons of sheet bars at $60, Youngstown, for prompt shipment, and forging billets at $70. A Pittsburgh mill is offering 1000 tons of sheet bars at $65, but as high as $75 has been offered by consumers. A Chicago mill has sold a Cleveland consumer a round tonnage of slabs at a reported price of $50 at mill. The shortage of sheet bars is still acute and one Cleveland mill is shut down for lack of raw material. The demand for plates has increased owing to inquiries from railroads. A Cleveland mill that is quoting plates at 3.75c. for domestic orders has taken some export business at 4c. A Lake shipyard has placed 12,000 tons of plates for six boats. A Valley sheet mill that recently booked orders at prices prevailing at time of shipment is making February shipments at 5.50c. for black and 6.50c. to 6.75c. for galvanized. For early delivery, blue annealed sheets are quoted at 5c. and a Cleveland mill has advanced its price to 6.25c. for black sheets. However, Valley makers report consumers are willing to pay 6.50c. to 7c. for black sheets and 8.50c. to 9c. for galvanized. Owing to the car shortage, some mills are shipping sheets in open cars. The shortage is acute in hot and cold strip steel, which are quoted as high as 4.25c. to 4.50c. for the former and 7c. for the latter. Local stocks of cold-rolled steel bars are exhausted. In structural lines the Toledo Bridge & Crane Co. has taken 2000 tons for the plant of Eaton Axle Co., Cleveland.

Coke.—Because of the car shortage shipments of foundry coke from the Connellsville district are barely 50 per cent normal and it is estimated at least 25 foundries in Cleveland and vicinity are shut down partly or entirely because of lack of fuel. Many foundries have placed orders for carload lots of egg coke for shipment from an Indiana by-product plant. This coke will cost the consumers approximately $12 per ton delivered.

Bolts, Nuts and Rivets.—The demand for bolts and nuts both in new orders and specifications are heavy and manufacturers are three to four months behind on deliveries. Makers are unable to get raw material in the form of wire and flat bars for small bolts and nuts as fast as needed. The demand for rivets is still very heavy. Orders are coming from various sources, but largely from the shipbuilding industry.

Raw Material.—The scrap market has quieted down and prices are easier on heavy melting steel, borings, turnings and a few other grades. Dealers are paying $27 for heavy melting steel scrap or 50c. a ton less than a week ago. The softening of the market is attributed to the falling off in buying and the new quotations represent only a slight scaling down from the peak prices reached during the recent rapid price moment. We note the selling of 300 tons of machine shop turnings at $18.50 and 500 tons of No. 1 busheling at $23.50, both f.o.b. Cleveland. We quote delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel	$27.00 to $27.50
Steel rails, under 3 ft.	32.00 to 33.00
Steel rails, rerolling	34.00 to 35.00
Iron rails	32.00 to 33.00
Iron car axles	41.00 to 42.00
Steel car axles	36.00 to 37.00
Low phos. melting scrap	30.00 to 31.00
Cast borings	19.00 to 19.50
Iron and steel turnings and drillings	19.00 to 19.25
Short turnings for blast furnaces	19.00 to 19.50
Compressed steel	24.00 to 25.00
Railroad wrought	29.00 to 30.00
Railroad malleable	33.00 to 33.25
Agricultural malleable	27.00 to 28.00
Steel axle turnings	23.50 to 24.00
Light bundled sheet scrap	18.50 to 19.00
No. 1 cast	38.00 to 39.00
No. 1 busheling	23.00 to 24.00
Drop forge flashings, 10 in. and under	23.00 to 23.25
Drop forge flashings, over 10 in.	22.50 to 23.00
Railroad grate bars	30.00 to 31.00
Stove plate	30.00 to 31.00

The Barde Steel Products Corporation which recently bought about 350,000 tons of plates, shapes and bars from the United States Shipping Board, has established an office at 114 Liberty Street and L. Baron, formerly manager of the engineering and chemical department of J. Aron & Co., Inc., has been appointed general export manager. Mr. Baron has been in the export business for the past 15 years, has traveled extensively and expects to sell a considerable part of the tonnage in question in foreign markets.

Non-Ferrous Metals

The Week's Price

Cents Per Pound for Early Delivery

	Copper, New York		Tin, New York	Lead		Spelter	
Jan.	Lake	Electrolytic		New York	St. Louis	New York	St. Louis
28	19.50	19.25	61.50	8.75	8.45	9.45	9.10
29	19.50	19.25	60.50	8.75	8.45	9.45	9.10
30	19.50	19.25	60.25	8.75	8.45	9.45	9.10
31	19.50	19.25	.....	8.75	8.45	9.35	9.00
Feb.							
2	19.50	19.25	60.25	8.75	8.45	9.35	9.00
3	19.50	19.25	59.00	8.75	8.45	9.35	9.00

NEW YORK, Feb. 3.

The extreme drop in foreign exchange has been the predominating influence in the markets, which continue uniformly quiet. Copper buying has slackened but prices are fairly firm. Quotations for tin fluctuate with the changes in the pound sterling and buying is extremely light. The lead market is quiet but still very firm. Demand for zinc is light and prices are easier. Antimony continues strong.

New York

Copper.—A falling off in demand is in evidence and it is even stated that some inquiries have been withdrawn from the market. Producers, however, continue to maintain their quotations firm at 19.25c., New York, for electrolytic for early delivery and at 19.50c. for Lake. Quotations for second half are about ¼c. above these levels. A fair business, however, has been done for both positions. Very little is heard of export business because of the low levels to which foreign exchange has dropped in the last two weeks.

Copper Averages.—The average price of Lake copper, for the month of January, based on daily quotations in THE IRON AGE, was 19.52c. The average price of electrolytic copper was 19.27c.

Tin.—The constant daily decline in the value of the pound sterling has been reflected in the quotations for spot tin which also have fallen almost daily until to-day when spot Straits was quoted at 59c., New York, a decline of 3c. in the week. As a natural result buying has been very light, consumers remaining largely absent from the market and buying being confined mostly to dealers. There has also been very little pressure to sell futures which are held around ½c. to 1c. above the price for spot tin. The London market continues fairly high with spot Straits quoted to-day at £386 5s., a decline of about £6 15s. from last week. Arrivals in January are reported to have been 4195 tons, of which 3285 tons came in at Atlantic ports. In stocks and landing at the end of the month there were 3723 tons. Tin afloat is reported as 5030 tons.

Lead.—The market has been and is quiet with demand very light, buying by consumers or dealers having been very small. Quotations are firm at 8.75c., New York, for spot and early delivery, and 8.45c., St. Louis, for early delivery. The effect of better production is beginning to be apparent, the amount of lead being evidently nearly equal to the present demand.

Zinc.—Market values for foreign exchange have had their effect on this market, but it has not been as pronounced as in some other metals. In most cases the decline in the pound sterling has been partly offset by an advance in the price of zinc in London. Domestic inquiry, however, is light but producers are not forcing the market. The net result, however, has been a slight decline in the price of prime Western which is quoted to-day at 9c., St. Louis, or 9.35c., New York, for early delivery.

Antimony.—Wholesale lots for early delivery are quoted at 11.25c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 31.50c. to 32.50c., New York, in wholesale lots for early delivery.

Old Metals.—The market is quiet. Dealers' selling prices are reported as follows:

	Cents per lb.
Copper, heavy and crucible	19.50
Copper, heavy and wire	18.50
Copper, light and bottoms	17.00
Brass, heavy	14.00
Brass, light	10.25
Heavy machine composition	19.00
No. 1 yellow rod brass turnings	12.00
No. 1 red brass or composition turnings	16.50
Lead, heavy	7.50
Lead, tea	5.50
Zinc	5.75

Chicago

Feb. 3.—With the exception of antimony the markets are weaker, copper, tin and spelter having declined. With regard to these three metals, as well as lead, the offering of concessions has brought out considerable business, a rather unusual situation as a sagging market is rarely attended by much buying. Tin has been eratic and has declined in the face of large purchases, much to the surprise of sellers. Antimony has advanced a half a cent, but there has been little buying which would seem to justify the rise in price. Old metals are unchanged. We quote Lake copper 19.75c. to 20c. for carloads, tin 62.50c. to 63c., lead 8.50c., spelter, 9.13c. and antimony, 12.50c. On old metals we quote copper wires, crucible shapes, 16.50c.; copper clips, 16.50c.; copper bottoms, 15c.; red brass, 16.50c.; yellow brass, 12.50c.; lead pipe, 6.50c.; zinc, 6.50c.; pewter, No. 1, 37.50c.; tinfoil, 40c., and block tin, 52.50c., all these being buying prices for less than carload lots.

St. Louis

Feb. 1.—The non-ferrous markets continue strong with quotations for car lots as follows: Lead, 8.50c.; spelter, 9c. to 9.25c.; in less than car lots: Lead, 9c.; spelter, 10c. to 10.25c.; tin, 68c.; copper, 21c.; antimony, 12c. Ore in the Joplin district was fairly strong with zinc blende, basis 60 per cent, $56 per ton; calamine, basis 40 per cent, $35 to $40 per ton, and lead, basis 80 per cent, $100 per ton. On miscellaneous scrap metals we quote dealers' buying prices as follows: Light brass, 8c.; heavy yellow brass, 10c.; heavy red brass, 13c.; heavy copper and copper wire, 16c.; pewter, 35c.; tinfoil, 43c.; zinc, 4c.; lead, 4.50c.; tea lead, 3.50c.; aluminum, 22c.

Imports of Manganese Ore Small

Manganese ore imports in November, 1919, were only 11,694 gross tons, making the total to Dec. 1 only 296,968 tons as compared with 469,879 tons for the same 11 months in 1918. Of the imports to Dec. 1, 1919, Brazil is credited with 219,852 tons. Cuba furnished 33,820 tons, British India 3800 tons, Japan 650 tons with 38,846 tons credited to other countries.

The Electric Furnace is the title of a new monthly publication issued by the Electric Furnace Co., Alliance, Ohio. While this is a house organ intended primarily for advertising the company's products, the aim of the company will be to use it as a medium to advance the whole electric furnace industry. The initial issue just off the press contains among other matter pertaining to the electric furnace industry, illustrated articles on the history of the electric furnace development by T. F. Baily, president of the company, and on automatic equipment for the electric heat treatment of ball bearing races by F. T. Cope, vice-president, and current news of the brass and steel plants.

The National Federation of Construction Industries will hold its first annual meeting at the Hotel Sherman, Chicago, March 24-25. The program will include discussions of freight traffic, standardization in the industry, foreign trade, financial relations, jurisdictional awards, housing and Americanization. John C. Frazee, Drexel Building, Philadelphia, is executive secretary.

An increase in the Cleveland Automobile Co.'s common stock from 14,000 to 300,000 shares, and the issuance of 20 new shares for each one now held, has been approved by the stockholders.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

(Prices quoted below represent as closely as they can be given those charged by mills to their regular trade for indefinite shipment. Owing to practical famine in supply of finished steel products and the heavy demand existing, tenders of new business are being made to the mills by jobbers and consumers at higher prices than those quoted below, but as a rule the mills are turning this offered business away.)

Freight rates from Pittsburgh on finished iron and steel products, including wrought iron and steel pipe, with revisions effective Jan. 1, 1920, in carloads, to points named, per 100 lb., are as follows: New York, 27c.; Philadelphia, 25c.; Boston, 29½c.; Buffalo, 21c.; Cleveland, 17c.; Cincinnati, 23c.; Indianapolis, 25c.; Chicago, 27c.; St. Louis, 34c.; Kansas City, 59c.; St. Paul, 49.5½c.; Denver, 99c.; Omaha, 59c.; minimum carload 80,000 lb. to four last named points; New Orleans, 38.5c.; Birmingham, 57.5c.; Pacific Coast, $1.25; minimum carload, 80,000 lb. To the Pacific Coast the rate on steel bars and structural steel is $1.315, minimum carload, 40,000 lb.; and 1.25, minimum carload, 50,000 lb. On wrought iron and steel pipe the rate from Pittsburgh to Kansas City is 50c. per 100 lb., minimum carload, 46,000 lb.; to Omaha, 50c., minimum carload, 46,000 lb.; St. Paul and Minneapolis, 49.5c., minimum carload 46,000 lb.; Denver, 99c., minimum carload 46,000 lb. Jacksonville, Fla., all rail, car lots, 41.5c.; less, 59c.; rail and water, car lots, 34.5c.; less, 46.5c. A 3 per cent transportation tax applies. On iron and steel items not noted above, rates vary somewhat and are given in detail in the regular railroad tariffs.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural size, 2.45c. to 2.70c.

Wire Products

Wire nails, $3.25 to $4.50 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.50, and shorter than 1 in., $2.00. Bright basic wire, $3 to $3.50 per 100 lb.; annealed fence wire, Nos. 6 to 9, $3 to $3.50; galvanized wire, $3.70 to $3.95; galvanized barbed wire and fence staples, $4.10 to $4.45; painted barbed wire, $3.40 to $3.75; polished fence staples, $3.40 to $4.50; cement-coated nails, per count keg, $2.85 to $3.75; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 60 per cent off list for carload lots, 59 per cent for 1000-rod lots, and 58 per cent off for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets ..... $4.15 base
Large boiler rivets $4.25
Small rivets, ¼ in., 5/16 in. and 7/16 in. diameter, 50 per cent off list
Machine bolts, hp. nuts, ⅜ in. x 4 in.:
Smaller and shorter, rolled threads. 50 and 10 per cent off list
Cut threads ..... 50 per cent off list
Larger and longer sizes ..... 40 and 5 per cent off list
Machine bolts, c.p.c. and t. nuts, ⅜ in. x 4 in.:
Smaller and shorter ..... 40 and 5 per cent off list
Larger and longer ..... 35 and 5 per cent off list
Carriage bolts, ⅜ in. x 6 in.:
Smaller and shorter, rolled threads. 45 and 5 per cent off list
Cut threads ..... 40 and 5 per cent off list
Larger and longer sizes ..... 30 and 10 per cent off list
Lag bolts ..... 50 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 ..... 50 per cent off list
Plow bolts, Nos. 4 to 10 ..... 50 plus 20 per cent off list
Hot pressed nuts, sq. blank ..... 2.50c. per lb. off list
Hot pressed nuts, hex. blank ..... 2.50c. per lb. off list
Hot pressed nuts, sq. tapped ..... 2.25c. per lb. off list
Hot pressed nuts, hex. tapped ..... 2.25c. per lb. off list
C.p.c. and t. sq. and hex. nuts, blank ..... 2.50c. per lb. off list
C.p.c. and t. sq. and hex. nuts, tapped ..... 2.25c. per lb. off list
Semi-finished hex nuts:
⅝ in. and larger ..... 65 per cent off list
9/16 in. and smaller ..... 70 and 10 per cent off list
Stove bolts in packages ..... 75-10 per cent off list
Stove bolts in bulk ..... 75-10-2½ per cent off list
Tire bolts ..... 60-10 per cent off list

The above discounts are from Nov. 1, 1919.
All prices carry standard extras, Pittsburgh basis.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $52 to $65; chain rods, $65 to $70; screw rivet and bolt rods and other rods of that character, $65 to $70. Prices on high carbon rods are irregular. They range from $75 to $100, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, ½ in., 9/16 in. and larger, $3.60 per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ⅝ in., 7/16 in. and smaller, $4 to $4.25 per 100 lb. in lots of 200 kegs of 200 lb. each or more; track bolts, $4.90 to $5 per 100 lb. in carload lots of 200 kegs or more, with the usual extras for small lots. Boat and barge spikes, $4.10 to $4.25 per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Tie plates, $3 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $13.80 per package; 8-lb. coating, I. C., $14.10; 12-lb. coating, I. C., $15.80; 15-lb. coating, I. C., $16.80; 20-lb. coating, I. C., $18.05; 25-lb. coating, I. C., $19.30; 30-lb. coating, I. C., $20.30; 35-lb. coating, I. C., $21.30; 40-lb. coating, I. C., $22.30 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars at 2.35c. to 3.00c. from mill. Common bar iron, 4.00c.

Wrought Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel: Inches	Black	Galv.	Iron: Inches	Black	Galv.
⅛, ¼ and ⅜	47	20½	⅛ and ¼	29½	2½
½	51	36½	⅜	30½	3½
¾ to 3	54	41½	½	34½	16½
			¾ to 1½	30	23½

Lap Weld

2	47	34½	1¼	24½	9½
2½ to 6	50	37½	1½	31½	17½
7 to 12	47	33½	2	32½	18½
13 and 14	37½		2½ to 6	34½	21½
15	35		7 to 12	31½	18½

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜	43	25½	¼, ¼ and ⅜	28½	11½
½	48	35½	½	33½	20½
¾ to 1½	52	39½	¾ to 1½	39½	24½
2 to 3	53	40½			

Lap Weld, extra strong, plain ends

2	45	33½	1¼	25½	10½
2½ to 4	48	36½	1½	31½	17½
4½ to 6	47	35½	2	33½	20½
7 to 8	43	29½	2½ to 4	35	23½
9 to 12	38	24½	4½ to 6	34½	22½
			7 to 8	26½	14
			9 to 12	21½	9½

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers have been seven (7) points lower (higher price) than carload lots and on butt and lap weld galvanized iron pipe have been nine (9) points lower (higher price).

Boiler Tubes

The following are the prices for carload lots, f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
3½ to 4½ in.	40½	3½ to 4½ in.	— 8
2½ to 3¼ in.	30½	3 to 3¼ in.	— 1½
2¼ in.	24	2½ to 2¾ in.	+ 1
1¾ to 2 in.	19½	2 to 2¼ in.	+10
		1¾ to 1⅞ in.	+20

Standard Commercial Seamless—Cold Drawn or Hot Rolled

Per Net Ton		Per Net Ton	
1 in.	$327	1¾ in.	$207
1¼ in.	267	2 to 2½ in.	177
1⅜ in.	257	2¾ to 3¾ in.	167
1½ in.	207	4 in.	187
		4½ to 5 in.	207

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department, which will be subject to special negotiations.

Sheets

Prices of the Steel Corporation for mill shipments on sheets of United States standard gage in carloads and larger lots for indefinite delivery are given in the left-hand column. For reasonably prompt delivery, mills have no trouble in getting prices quoted in the right-hand column, or even higher prices.

	Cents per lb.
Blue Annealed—Bessemer	
No. 8 and heavier	3.50 to 4.00
Nos. 9 and 10 (base)	3.55 to 4.05
Nos. 11 and 12	3.60 to 4.10
Nos. 13 and 14	3.65 to 4.15
Nos. 15 and 16	3.75 to 4.25
Box Annealed, One Pass Cold Rolled—Bessemer	
Nos. 17 to 21	4.15 to 4.65
Nos. 22 to 24	4.20 to 4.70
Nos. 25 and 26	4.25 to 4.75
No. 27	4.30 to 4.80
No. 28 (base)	4.35 to 4.85
No. 29	4.45 to 4.95
No. 30	4.55 to 5.05
Galvanized, Black Sheet Gage—Bessemer	
Nos. 10 and 11	4.70 to 5.20
Nos. 12 to 14	4.80 to 5.30
Nos. 15 and 16	4.95 to 5.45
Nos. 17 to 21	5.10 to 5.60
Nos. 22 to 24	5.25 to 5.75
Nos. 25 and 26	5.40 to 5.90
No. 27	5.55 to 6.05
No. 28 (base)	5.70 to 6.20
No. 29	5.95 to 6.45
No. 30	6.20 to 6.70
Tin-Mill Black Plate—Bessemer	
Nos. 15 and 16	4.15 to 4.65
Nos. 17 to 21	4.20 to 4.70
Nos. 22 to 24	4.25 to 4.75
Nos. 25 to 27	4.30 to 4.80
No. 28 (base)	4.35 to 4.85
No. 29	4.40 to 4.90
No. 30	4.40 to 4.90
Nos. 30½ and 31	4.45 to 4.95

PERSONAL

E. Donald Tolles has been engaged as executive secretary of the Electric Hoist Manufacturers' Association. The office of the association hereafter will be located at 52 Broadway, New York. C. W. Beaver of Yale & Towne Mfg. Co., Stamford, Conn., is the president of the association, and R. H. McGredy of Shepard Electric Crane & Hoist Co., Montour Falls, N. Y., is secretary-treasurer. The next meeting of the association is scheduled to be held on Friday, Feb. 20, 1920, at 9 East Fortieth Street, New York.

P. D. MACKEY

P. D. Mackey has been appointed general superintendent of the Eastern Steel Co., Pottsville, Pa. He began his career as an office boy of the Carnegie Steel Co. and mastered the steel business from the bottom up. After leaving Pittsburgh he was connected with the Republic Iron & Steel Co., Youngstown, Ohio; the Colorado Fuel & Iron Co., Pueblo, Col., and the Bethlehem Steel Co., Bethlehem, Pa. At the outbreak of the European war he went to Montreal, Can., to demonstrate the superiority of electric steel for shell making for the English Government. At present Mr. Mackey is in charge of the electric steel department for Henry Disston & Sons, Tacony, Philadelphia, with which firm he has been for the past two years.

A. K. Oliver has been elected a director of the Pittsburgh Coal Co., Pittsburgh, to fill a vacancy caused by the death of Henry R. Rea, and James Carstairs of Philadelpia has been made a director to fill a vacancy caused by the death of John J. Fisher of the Fisher Oil Co., Pittsburgh, who died recently.

C. J. Stilwell, foreign sales manager, Warner & Swasey Co., Cleveland, sailed Jan. 21 for a three-months' trip to Europe. During his stay abroad he expects to visit England, France, Belgium, Holland and possibly other countries.

W. A. Thomas, former president Brier Hill Steel Co., Youngstown, Ohio, left for California last week for an extended visit.

Herbert DuPuy, formerly chairman of the Crucible Steel Co. of America, Pittsburgh, who resigned some months ago on account of ill health, is recuperating at Palm Beach, Fla.

C. W. Lucius has been elected president and general manager of the Lucius Mfg. Co., manufacturer of welded steel vaults, caskets and tanks, Massillon, Ohio. A. F. Dieringer has been made vice-president, and E. H. Kraft secretary and treasurer.

Charles Eisler, for many years connected with the Westinghouse Lamp Co., who has just completed a modern lamp factory for the Save Electric Corporation, has accepted the position of consulting engineer and vice-president of the Newark Engineering & Tool Co., Newark, N. J.

Charles M. Biggar, head of C. M. Biggar & Co., Cincinnati, has been elected a vice-president of the Lemoyne Steel Co., Pittsburgh. Mr. Biggar will represent the company in the Cincinnati district, and has opened an office and warehouse at 414 Elm Street, where it is proposed to carry in stock a complete line of carbon and high-speed steels.

The Cromwell Steel Co., Cleveland, with works at Lorain, Ohio, has re-elected its officers for the year, as follows: Veryl Preston, president; George H. Beaumont and H. A. Raymond, vice-presidents; Harold T. Clark, secretary. The directors include these officers and Charles L. Bradley, H. C. Robinson, W. H. Purcell and H. C. Cromwell.

L. L. White, ex-lieutenant recently in charge of the sales branch, salvage division, Atlanta Supply Depot, Atlanta, Ga., announces that he is engaged in the salvage and waste material business under the name of Salvage Sales Co., 71 South Pryor Street, Atlanta, Ga., handling scrap metals and miscellaneous Army salvage material.

Victor Baudin, who has represented André Citroën, gear maker and automobile manufacturer, Paris, France, at 9 East Fortieth Street, New York, plans to return to Paris on Feb. 14 and will close the company's New York office.

At a meeting of the board of directors of the Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa., on Feb. 2, David E. Tracy, who has been general superintendent and afterward president for the last five years, resigned as president but remains as a member of the board of directors. E. Z. Wallower resigned as vice-president and as a director. William T. Hildrup, Jr., secretary and treasurer of the company and its predecessor since 1890, and who has been general manager as well for the last seven years, resigned all his offices with the intention of reducing his business responsibilities and to travel extensively in foreign countries. Mr. Hildrup retains, however, his membership on the board of directors. Alfred K. Barker, New York, who for the past five years has had charge of the steel department of W. R. Grace & Co., was elected as a director and as president of the company, in charge of all sales. Elvin C. Frey, who has been a director and assistant treasurer, was elected treasurer in charge of financing and accounting. Edward C. Smith, now acting general superintendent, was elected as vice-president and general superintendent, in full charge of the plant and production. Norman W. Cassel, assistant to the retiring general manager, was elected as secretary, in charge of purchases. The new board of directors will consist of Messrs. Barker, Frey, Hildrup, Starkey and Tracy. The affairs of the company will be conducted by the new officers guided by an executive committee consisting of Messrs. Barker, Cassel, Frey and Smith, which will report to the board of directors at a monthly meeting.

Herman E. Townsend has resigned as superintendent of the Franklin works of the Cambria Steel Co. to become sales manager of the Haws Refractories Co., Johnstown, Pa. Mr. Townsend has been with the Cambria company for about three years.

Alexander J. McConnell, who during the period of the British War Mission in the United States was director of purchases of raw metals, arrived at New York last week on the Rotterdam on a further special mission to secure supplies of ferromolybdenum for the British steel industry. Great interest is reported as being taken in the possibilities of molybdenum steel in Great Britain.

Charles E. Tudor, sales manager of the Tudor Boiler Works, Cincinnati, has been appointed safety director of Cincinnati by Mayor Galvin, in succession to the late John R. Holmes.

W. E. Snyder, mechanical engineer of the American Steel & Wire Co., gave a talk recently before the Pittsburgh branch of the National Society of Stationary Engineers on "Modern Industrial Power Plants."

A. H. Dillon, formerly assistant general manager of sales in charge of wire products of the Youngstown Sheet & Tube Co., and lately with the Liberty Steel Products Co., New York, has acquired a financial interest in the H-C Tack Co., Cleveland, with which he will become actively identified. Since resigning from the Sheet & Tube Company Mr. Dillon has maintained an office at 604 Stambaugh Building, Youngstown, Ohio, though his business has taken him to all parts of the country.

William D. McHugh of Omaha, Neb., has been appointed general counsel of the International Harvester

Co., with headquarters at Chicago, to succeed Edgar A. Bancroft, resigned, effective April 1.

At the meeting of the Cincinnati Chapter, American Steel Treaters' Society, Jan. 30, in the chemical auditorium of the Ohio Mechanics' Institute, a lecture, illustrated with moving pictures, was given on "The Manufacture of High-Speed Steel," by Mr. Carleton, of the Atlas Crucible Steel Co.

Harold A. Wright, Boston, representing the Porter-Cable Machine Co., Syracuse, N. Y., has moved to room 311, 201 Devonshire Street.

William C. K. Altes, electrical engineer, General Electric Co., Pittsfield, Mass., has resigned. He will engage in busIness in Amsterdam, Holland. Mr. Altes came to this country in 1900 and has been employed by the General Electric Co. at Pittsfield and Schenectady and in 1918 represented that company at Java, returning from that country in December last.

William P. Mullane, vice-president of the Sligo Iron & Steel Co., in charge of operations at the Connellsville, Pa., plant, and formerly of Youngstown, Ohio, has resigned to take a similar position with the Interstate Iron & Steel Co., South Chicago.

Alf Tjersland, director of the heating and plumbing goods manufacturing and contracting firm of E. Sunde & Co., Christiania, Norway, is now in the United States for a few months' stay, partly to study American products and methods. He is accompanied by Johan Karlsen, an engineer of his company, and he has been joined by Sigurd Frivik, works manager of the company, who has been here some time.

The United States Cast Iron Pipe & Foundry Co. has opened an office in the Scollard Building, Dallas, Tex., in charge of T. W. Hanlon, southwestern sales agent.

Harry W. Haggerty, general sales manager McKinney Steel Co., Cleveland, has started on a five weeks' trip to the Hawaiian Islands.

President M. I. Arms, II, announces the appointment of John H. Rose, eight years in the engineering department of the Youngstown Sheet & Tube Co., Youngstown, Ohio, as sales engineer of the Aetna Foundry & Machine Co., Warren, Ohio. He assumed his new duties Feb. 1. Owing to demand the Aetna company is planning additions to capacity.

F. Y. Casey, formerly with H. H. Lineaweaver & Co., has resigned to become the Philadelphia representative of W. J. Rainey, coke, with headquarters in the Real Estate Trust Building, Philadelphia, vice A. F. Kempe, who has been made assistant manager of sales and transferred to the general offices of this company in New York.

The Westinghouse Electric & Mfg. Co. has announced promotions among its officials at East Pittsburgh, as follows: Alexander Taylor, for many years manager of works, has been made assistant to vice-president in general charge in all plants of production, stocks and stores. R. L. Wilson has been promoted from position of general superintendent to works manager of the East Pittsburgh works. E. R. Norris has been appointed director of works equipment, in charge of machinery, tools and methods in the various plants. C. B. Auel was made manager of the employees' service department. G. M. Eaton has been made chief mechanical engineer of the company; C. W. Johnson and H. W. Cope, assistant directors of engineering; C. H. Champlain and E. S. McClelland, assistant works managers; John E. Bonham, assistant to works manager; E. S. Brandt, supervisor of equipment and methods. The following were appointed as managers of the engineering departments named: A. M. Dudley, automobile equipment; R. P. Jackson, material and process; F. E. Wynne, railway equipment department; G. H. Garcelon, small motor.

A. W. Green, Windsor, Trumbull county, has been elected president of the Supreme Motors Corporation, with a plant at Warren, Ohio. The company recently increased its capital from $1,000,000 to $2,000,000.

The Stalnaker Steel Co., Frick Building, Pittsburgh, dealer in iron and steel scrap, has opened a New York office at 132 Front Street, with Walter F. Ripperger in charge, as district manager. Mr. Ripperger for many years was assistant to the general manager of the Metal & Thermit Corporation, New York, and is also vice-president and general manager of Charles A. Anderson & Co., New York. Through Mr. Ripperger, the Stalnaker Steel Co. will handle all its business in the New England States, eastern New York and eastern Pennsylvania.

President James H. Grose of the Brier Hill Steel Co., Youngstown, Ohio, has appointed Paul W. Shale his secretary. For five years Mr. Shale was in the sales department and formerly in the cost department. He has been with the Brier Hill company since its formation in 1912.

Robert T. Lozier has resumed his practice as industrial consultant in room 2636, Woolworth Building, New York.

Directors were re-elected Jan. 27 at the yearly meeting of the Youngstown Foundry & Machine Co., as follows: W. J. Wallis, B. G. Parker, H. P. Parrock, Frank Williams, S. K. Hine, A. E. Adams and E. Hartzell. Officers will be chosen later.

Edward S. Lewis, formerly assistant cashier of the Philadelphia National Bank, has been elected secretary-treasurer of N. & G. Taylor Co., Inc., Philadelphia, manufacturer of steel and tin plate.

A. A. Roelofs, formerly special representative of the Precision & Thread Grinder Mfg. Co. in the Ohio territory, has been advanced to manager of the Chicago office. The company makes the Multi-Graduated precision grinder.

John Bodden has retired as president of the Van Brunt Mfg. Co., Horicon, Wis., manufacturer of agricultural implements, after 34 years of service with the corporation. Fred H. Clauson, vice-president and general manager, succeeds Mr. Bodden.

G. C. Weyland, formerly of Kansas City, Mo., has been elected vice-president J. I. Case Plow Works Co., Racine, Wis., to succeed L. N. Burns, who resigned Jan. 15. The position includes the general sales management.

C. H. Wood, for several years in the sales department of the National Tube Co., Pittsburgh, has resigned, and is now connected with the Ohio Seamless Tube Co., Shelby, Ohio. He has been succeeded in the Pittsburgh office of the National Tube Co. by D. R. Mason, who for some time has been looking after sales in the Detroit district, and C. V. Lally, who has been connected with the sales department in the New York office, has been transferred to Detroit to succeed Mr. Mason.

W. Stewart Horner, president of the National Association of Sheet and Tinplate Manufacturers, also of the Pittsburgh Shovel Co., and W. S. Horner & Co., Pittsburgh, has been elected a director of the Exchange National Bank of that city.

OBITUARY

EDWARD PRICER, JR., manager of the distributers' division of the Midvale Steel & Ordnance Co., Philadelphia, died Monday, Feb. 2, following a week's illness of pneumonia. He had been connected with the Midvale and Cambria companies for 10 years. Before becoming manager of the distributers' division he was in charge of the wire department. He leaves a widow.

D. L. CARPENTER, a director of the Cincinnati Pulley Machinery Co. and the Tool Steel Gear & Pinion Co., died at his home on Reading Road, Cincinnati, recently. Mr. Carpenter was also the head of the hardware firm bearing his name, and of the Foy & Starr Co., mantel and tile makers.

E. T. CLARAGE, president the Columbia Tool Steel Co., Chicago Heights, Ill., died at his home in Chicago on Jan. 29, following a brief attack of pneumonia.

British Conditions Worse

Workmen Refusing to Roll Thin Sections—American and Belgian Steel Offered

(By Cable)

LONDON, ENGLAND, Feb. 2.

Conditions in the steel market are as difficult as ever and increasingly so. As regards thin sheet plates workmen in some cases are refusing to roll anything under 1/16 in. thick because they can earn more on heavier gages. Industrial progress is greatly hindered because of the scandalous mismanagement of the railroads. There are fully 70,000 tons of steel in stock in makers' yards at Middlesbrough, which cannot be moved, some works being forced on short time and refusing further business.

The Cleveland foundry pig iron market is strong, makers declining to quote for export owing to the heavy home demand. The outlook regarding production is uncertain for reasons already stated. Export demand is insistent especially for hematite for which good orders have been booked for Belgium. For neutrals up to 240s. is asked.

A large business has been done in Welsh bars at £25 for April-September delivery. Odd lots of American billets are being offered, f.a.s. New York, for quick shipment. A few lots of Belgian steel are being offered at fancy prices, £31 being asked for ⅛ in. plates, £31 10s. for 3/32 in. plates and £34 5s. for 1/16 in. plates, all f.o.b. Liege, based on current exchange.

Most makers of tin plate are fully booked until July and some until October. There is a growing export demand from the Continent but the market is less excited, especially for last half and some merchants are coming out as resellers. A further 300,000 oil sizes have been sold for last quarter at 74s. for the 18¾-in. size. Mills are unwilling to produce small sizes, which accounts for the high price. Argentina has resold 100,000 boxes, 20x28-in., and odd sizes out of 500,000 boxes shipped there on the war meat contract. Of these 40,000 are being shipped to United Kingdom home consumers and the balance for export markets and only odd sizes are now left. America is offering 50,000 base boxes at $11.20 c.i.f. United Kingdom and also terne plates, 20x28-in., 200 lb., at $19.75 c.i.f. United Kingdom, both for February-March shipment. American makers are also offering tin plates for second quarter delivery but the competition is not regarded as serious, though it may possibly become so in the second half. Large sales of Welsh tin plates have been made at £25 for delivery up to July.

Ferromanganese has been advanced 30s. for the home trade to £30 and for the export trade 50s to £35 10s. ($123.50 with exchange at $3.48 for £1) but much more is being paid for certain markets.

Clyde shipbuilders launched in January 40,000 tons, nearly equalling the record output of 1912. Armstrong, Whitworth & Co., Ltd., is acquiring the Pearson & Knowles Coal & Iron Co., Ltd., of Warrington, providing shareholders agree. The offer of the Sperlings to buy the Lanarkshire Steel Co., Ltd., has been accepted.

We quote per gross ton, except when otherwise stated, f.o.b. makers' works, with American equivalents figured at $3.48 for £1, as follows:

	£	s.	d.	£	s.	d.	
Ship plates	22	10	0 to	25	10	0	$78.30 to $88.74
Boiler plates	26	10	0 to	29	0	0	92.22 to 100.92
Tees	20	10	0 to	23	0	0	71.34 to 80.04
Channels	19	15	0 to	22	15	0	68.73 to 79.17
Beams	19	10	0 to	22	10	0	67.86 to 78.30
Round bars, ¾ to 3 in.	22	0	0 to	24	10	0	76.56 to 85.26
Rails, 60 lb. and up	18	15	0 to	19	5	0	65.25 to 66.99
Billets	23	0	0				80.04
Steel hoops	28	15	0 to	29	0	0	100.05 to 100.92
Tin plates	0	70	0 to	0	72	0	12.18 to 12.52
Sheet and tin plate bars, Welsh	23	0	0 to	25	0	0	80 04 to 87.00
Galv. sheets, 24 g.	49	0	0				170.52

BELGIUM NEEDS CARS

Financial Questions Cause Delay — Denmark's Action in Regard to Exchange

The Belgian Government is trying to conclude negotiations for the purchase of 18,800 freight cars. Possibly 3000 of these will be built by two Canadian companies, and the American Car & Foundry Co. and the Standard Steel Car Co. are co-operating in an effort to build 5000 of them in the United States. The Belgian Government requires that the cars be assembled in that country, for which purpose the American car builders will have to erect a plant, which will be turned over to the Belgian Government at the conclusion of the contract. In payment for the cars the Belgians are offering 6 per cent five-year Belgian bonds, which at present have no marketable value, and it is this feature more than any other which has caused the delay in closing the deal.

The principal exporters of steel products are taking only such business as cannot be forestalled. Japan is the high bidder on any material that is available, but the policy of the leading exporters is to apportion their tonnage among various countries, and Japan is getting no more than its share.

Present shipments of iron and steel from the United States are estimated at 300,000 to 400,000 tons a month, most of this going to the Far East and South American countries. Europe is buying billets and pig iron when possible, but the serious exchange situation and the scarcity of semi-finished steel for export are restricting the amount of business.

Denmark is the first European country to take official action toward stabilizing rates of exchange. This has been done by putting the selling of exchange under Government control, which is equivalent to licensing imports. If other European countries resort to similar measures to protect their falling exchange, a large decrease in American export business will result. This, it is held, would affect foods and other products more than steel.

Export Notes

A large firm of exporters shipped between 12,000 and 13,000 tons of steel, chiefly bars, to Japan during the past month, and has about the same amount on its books. It has one inquiry for about 10 miles of narrow gage 12-lb. rail for shipment to Japan. A great deal of the heavy purchasing of the Japanese is being resold throughout the Orient, particularly in China and Manchuria.

An exporter who recently made a tour of the steel centers in the United States found few plants operating near capacity, due to fuel shortage and inability to obtain labor, where they were dependent on the foreign element. He found several plants preparing to take advantage of high prices by manufacturing new lines, and one plant that had abandoned the manufacture of wire nails was arranging to resume this line on a large scale.

An export firm with its chief interests in South America and Cuba recently shipped 500 tons of tank plates to Havana.

The Chilean Legislature has authorized a contract to construct a railroad from Porto Bolivar, Ecuador, to Porto Pava, Brazil, on the Amazon river.

A Japanese firm of exporters recently received an inquiry from the Imperial Government for about 20 miles of 60-lb. rail. The Tokio office of this company reports a heavy inquiry from the Government for 12-lb. rail to be shipped direct to Siberia.

Inquiry from South American markets continues to be chiefly for galvanized wire, plain and barbed, but business is light with most exporters, as purchasers in these markets demand very favorable terms.

According to *L'Usine* three of the eight large spelter works in the province of Liége have resumed operations. From 1904 to 1914 Belgium produced 21.6 per cent of the world's spelter output. In 1913 the Belgian output was 204,200 tons, but it fell to 8000 tons in 1919.

IRON AND INDUSTRIAL STOCKS

Government's Taking of Rails Influences Prices for Securities

NEW YORK, Feb. 2.

The action of the Railroad Administration in placing orders for rails at prices to be determined later has influenced the course of prices for securities of late. If the roads are returned March 1 a considerable part of the rails just ordered will be delivered after the roads are passed back into private hands. In that case the steel companies will have to look to the railroad companies for payment and doubt is expressed in some quarters as to the ability of certain roads to meet obligations. Then, too, that rails are to be given priority at a time when the steel companies are heavily booked with orders and the consumers are anxious for steel also is disturbing in certain quarters.

United States Steel has held comparatively steady, however, due to a more favorable statement for the quarter ending Dec. 31 last than was expected. The preliminary annual report of Bethlehem evidently was better than anticipated, at least the recent action of its securities marketwise would so suggest. Republic Iron & Steel has been noticeably strong and Crucible as conspicuously weak, being influenced more by technical market conditions than anything else.

Equipment shares, notably Baldwin Locomotive, have been inclined to do better, although the action of the Railroad Administration as regards rails is clearly reflected in this group of securities. The Pressed Steel Car Co.'s annual report to be issued Feb. 18, the first to be put out by the large equipment companies, is awaited with considerable interest. Its probable showing has been reflected in the action of the stock.

Automobile stocks have had a larger following of late and quotations for them have been higher as a result. Much of the buying is based on a belief that the leading producers of pleasure cars and trucks have many years of prosperity ahead of them. Talk of higher prices for automobile tires has had its influences on the market for such stocks as United States Rubber.

The copper shares have no more than held their own. The transportation situation is such that doubt is expressed in certain quarters as to the ability of the leading copper producers to earn enough money to meet dividend and interest requirements during the three months ending March 31.

The range of prices on active iron and industrial stocks from Tuesday of last week to Wednesday of this week was as follows:

Allis-Chalm. com..	49 - 50	Int. Har. pf.....	113 -114⅛
Allis-Chalm. pf...	87 - 87⅛	La Belle Iron cm.	— -112
Am. Can com.....	50⅞- 57	Lackaw. Steel....	81¼- 86¾
Am. Can pf.....	98 - 99½	Lake Sup. Corp...	20½- 20½
Am. Cr. & F. cm.	135 -139⅜	Midvale Steel.....	47¾- 50⅝
Am. Cr. & F. pf..	115 -116	Nat.-Acme	37⅞- 38¼
Am. Loco. com...	94¾-101	Nat. E. & St. cm.	78¼- 82
Am. Loco. pf.....	104⅛-104½	Nat. E. & St. pf..	101⅝-102
Am. Radiator pf..	— -120	N. Y. Air Brake..	106 -109
Am. Ship pf.....	— - 80	Nova Scotia Stl..	67⅜- 72⅜
Am. Stl. Fdr. cm.	43⅝- 45⅝	Pittsb. Steel pf...	90½- 91
Am. Stl. Fdr. pf..	93 - 93⅜	Pressed Stl. com..	95⅞-100
Bald. Loco. com..	116⅛-122⅜	Pressed Stl. pf....	— -104½
Bald. Loco. pf....	100 -101	Ry. Stl. Spg. com	96 - 99⅜
Beth. Stl. com....	91½- 95¼	Replogle Steel.....	43 - 46
Beth. Stl. Cl. B...	93⅜- 99⅞	Republic com.....	107 -117⅞
Beth. Steel, 8 per cent. pf.....	113⅝-114	Republic. pf.....	— -103⅝
Case, J. I., pf.....	99 - 99¼	Sloss com.....	73 - 81⅝
Central Fdry. pf..	— - 47	Superior Steel....	47½- 49⅝
Chic. Pneu. Tool..	90 - 95	Transue-Williams.	60¼- 62⅝
Colo. Fuel.....	38⅞- 41⅞	U. S. Alloy Steel..	48½- 49½
Crucible Steel com...	210 -228	U. S. Pipe com...	19¼- 23
Crucible Steel pf.....	99¼- 99½	U. S. Pipe pf.....	43 - 53⅜
Gen. Electric.....	164 -170¾	U. S. Steel com...	102½-107¼
Gt. No. Ore. Cert.	37½- 39	U. S. Steel pf....	112⅞-115¾
Gulf States Steel.	73 - 82¾	Vanadium Steel...	48⅛- 53
Int. Har. com.....	123 -130¼	Va. I. C. & Coke.	81 - 90
		Westingh. Elec...	52⅜- 54⅞

Dividends

The American La France Fire Engine Co., quarterly, 2½ per cent, payable Feb. 16.

The National Acme Co., quarterly, 1¾ per cent, payable March 1.

The Sloss-Sheffield Steel & Iron Co., quarterly, 1½ per cent on the common, payable Feb. 10.

The Crucible Steel Co. of America, quarterly, 3 per cent on the common, payable Jan. 31.

The Superior Steel Corporation, quarterly, ¾ per cent and extra ½ per cent on the common, payable Feb. 2, and 2 per cent on the first and second preferred, payable Feb. 16.

The Ingersoll-Rand Co., quarterly, 2½ per cent, payable Jan. 31.

The Midvale Steel & Ordnance Co., quarterly, $1, payable Feb. 1.

The Pittsburgh Steel Co., quarterly, 1¾ per cent on the preferred, payable March 1.

Industrial Finance

The directors of the Union Tank Car Co. have voted to increase the capitalization outstanding by an issue of $12,000,000 7 per cent cumulative non-voting preferred stock, which has been underwritten by a New York trust company.

The War Finance Corporation has loaned $6,000,000 to the Baldwin Locomotive Works on the latter's 10-year Polish Government notes, offered in payment for a large amount of railroad equipment. The American Locomotive Co. took Belgian treasury notes in payment for 150 locomotives, but was able to realize on them through other than War Finance Corporation channels.

Annual report of the Portage Silica Co., Youngstown, Ohio, is a reflection of irregular foundry operations in 1919. Last year the company produced 87,300 tons of silica sand but shipped 110,000 tons, drawing on stock piles. It has 50,000 tons piled on its property at present. Both production and shipments are below the 1918 record. Some steel foundries were idle during the year and majority operated from 35 to 50 per cent of normal. Of the company's product, 90 per cent consists of silica sand for steel molding and sand blasts, cores, filters, traction sand and the like. During the year a new dryer was installed.

A syndicate of New York bankers has been formed to purchase and finance a combination of electric welding companies, the new company to be called the Associated Welding Cos., Inc. The company has an authorized capitalization of 400,000 shares of no par value, half of which will be offered publicly within a short time.

Boston bankers are offering a new issue of Union Twist Drill Co. 7 per cent cumulative preferred stock, which is redeemable at $110 a share and accrued dividend, a sinking fund for this purpose having been established. The chief plants of the company are located at Athol, Mass.

A public offering of Wickwire Spencer Steel Corporation securities is being made by bankers: $7,500,000 8 per cent first preferred cumulative stock, par $100, for which the articles of incorporation provide an annual sinking fund, commencing in 1923, which is estimated to retire the present issue within 20 years; also $12,500,000 7 per cent first mortgage sinking fund bonds, a part of the authorized issue of $30,000,000.

"Side Lights on Aluminum and Non-ferrous Metals" is the subject of a booklet of 152 pages, 5¼ x 7½ in., published by the United Aluminum Co., Inc., New Haven, Conn. The properties, characteristics, uses and commercial forms of aluminum are discussed and the qualities and uses of various kinds of aluminum alloys, processes in melting and casting, rolling of sheets, working and finishing of aluminum, are explained. Chapters are included on the action of alkali and acid on aluminum, soldering aluminum, the use of aluminum in the manufacture of steel, Babbitt metals, U. S. A. Babbitts, solder and silvabrite. A Babbitt metal guide which gives a list of uses and the U. S. A. Babbitts recommended for them, and tables of useful information are included.

The Worcester Auto Body and Welding Co., Worcester, Mass., has issued 80 shares additional common stock having a par value of $8,000, bringing the total amount outstanding up to 30,000 shares. There are

20,000 shares of preferred stock outstanding as well. Jacob Salo is president.

The Athol Machine Co., Athol, Mass., has issued an additional 4500 shares having a par value of $100 each, or $450,000. The new stock has been subscribed for. The company now has 5000 shares outstanding, par $100, or a total capitalization of $500,000.

Notice has been filed with the Massachusetts secretary of state of an increase in the capitalization of the Herschell-Spillman Motor Co., North Tonawanda, N. Y., by an issue of 13,000 shares of preferred stock having a par value of $650,000. The company now has outstanding 40,000 shares of common stock and a similar amount of preferred.

The Wickwire Spencer Steel Corporation, Buffalo, recently formed by a merger of the Wickwire Steel Co. of this city and the Clinton-Wright Wire Co., Boston and Worcester, Mass., capitalized at $30,000,000, has arranged for an issue of securities totaling $20,000,000, divided into bonds for $12,500,000 and stock, $7,500,000. The company operates seven plants in New England, comprising the former works of the Clinton Wire Cloth Co., the Wright Wire Co., Spencer Wire Co., Morgan Spring Co., and the National Mfg. Co. T. H. Wickwire, Jr., is president.

The Union Twist Drill Co., Athol, Mass., is to be reorganized. The assets of the old company and those of the S. W. Card Mfg. Co. and Butterfield & Co., now controlled by stock ownership, will be transferred to a new Massachusetts corporation with $1,000,000 common and $3,129,600 preferred stock.

Annual Report of Inland Steel Co.

At the annual meeting of the Inland Steel Co., Chicago, stockholders voted to reduce the par value of the stock from $100 to $25 a share and to exchange the existing stock in the ratio of one to four for the new shares. The company is now incorporated under the laws of Delaware with $30,000,000 capital stock. The proposal to reincorporate under the laws of Illinois and to recapitalize, making the shares no par value, was not acted upon at the meeting. The annual report shows a decrease in net earnings, reflecting the operating difficulties encountered during the steel and coal strikes. The balance available for dividends was equal to 20.24 per cent compared with 20.65 per cent in the preceding year. The income account, as compared with that of 1918, is as follows:

	1919	1918
Net earnings after maintenance and reserve for taxes	$6,830,146	*$14,473,512
Depreciation	1,360,552	1,650,000
Min. exhaustion	63,500	303,712
Bond interest	340,890	353,250
Net profits for year	$5,065,113	$12,166,549
Add sur. adjustment	.....	1,241,826
Provisions for federal tax	.....	7,000,000
Balance	$5,065,113	$6,408,376
Dividends paid	2,001,560	2,001,060
Surplus for year	$3,063,553	$4,407,316
Previous surplus	14,301,972	9,894,656
Total surplus	$17,365,525	$14,301,972

*Before provision for taxes.

Financial Report of Bethlehem Steel Corporation

After deducting preferred dividends, net earnings of the Bethlehem Steel Corporation for 1919 were $19.80 per share of common stock, or $1 less than the year before, or $15,356,860 compared to $15,930,390 in 1918. Net income represented a profit of only 5.45 per cent on the volume of business done. Gross sales of 1919 were $281,641,907 against $448,410,808 in the preceding year.

Orders on hand, Dec. 31, 1919, totaled $252,449,000 as against $328,946,000 a year before. According to President Grace, all plants, steel and ship, are working at full capacity, as far as coal supply will allow. Every shipbuilding way is definitely scheduled for 1920, and in some cases into the first half of 1921.

During 1918 the corporation expended $25,500,000 for extensions and additions to plants. All good will has been written off the books, as have the war contracts not adjusted by the Government. Prices have been raised about $4 a ton above prices fixed by the Industrial Board on March 21, and President Grace admitted likelihood of further increases because of probable increased freight rates upon the return of the railroads to private management.

Steel & Tube Co. of America Earnings

The Steel & Tube Co. of America reports earnings for the properties consolidated in the company for the year ended Dec. 31, after deducting interest and discount and Federal taxes, as $4,067,940, which is practically three and two-thirds times dividend requirements on the outstanding $17,500,000 7 per cent preferred stock for the full year, although the preferred stock issue was outstanding, and the funds therefrom available to the company only during the last half of the year.

The president of the company, A. A. Schlesinger, commenting upon the present business and the outlook for the future, says:

> The business of the Steel & Tube Co. of America can be summed up by the statement that the demand at present exceeds the productive capacity. This refers not only to the tubular goods and other steel products, but also to the pig iron and malleable and gray iron castings. All our steel and finishing plants are running full capacity. We have all the help required and our labor situation is entirely satisfactory. Orders on our books will allow us to operate as we are at present for a period of at least six months. It is necessary for us to continually decline orders. I can state with a great deal of confidence that the business outlook for this company never was more promising.

Dominion Bridge Co. Report

The annual statement of the Dominion Bridge Co., Montreal, Que., showed earnings applicable to the common stock amounting to $1,343,305, equal to 20.6 per cent. This compares with $1,865,717 or equivalent to 28.7 per cent in 1918. During the annual meeting, in reply to a question from one of the shareholders, the statement was made that included in the net earnings given were $770,000 from the St. Lawrence Bridge Co. Total earnings from all sources amounted to $1,640,531, a decline of $806,478 from last year's total. Depreciation account was $128,388 as compared with $404,472 in 1918. There was little change of importance in the remaining items. The amount carried forward was $823,305, or $522,412 less than that of last year. This brings the total of credit, profit and loss to $3,846,613.

American Brass Co. Report

The 1919 report of the American Brass Co. shows net earnings of $2,856,140, as compared with $3,992,219 in 1918, $7,109,177 in 1917, $10,991,669 in 1916, and $6,128,453, $1,450,347, $1,917,605, $2,274,738, in 1915, 1914, 1913, 1912, respectively.

The corporation last year paid $1,800,000 in dividends, as against $3,000,000 in 1918, $6,675,000 in 1917, and $3,750,000 in 1916. Its 1919 surplus after dividends was $1,056,140; in 1918 it was $992,219, and in 1917, $434,177.

The Savage Arms Corporation is preparing to manufacture motor truck axles, roller bearings and automobile parts at its Sharon, Pa., works. The company is now completing a contract of 3-in. rapid-fire guns for the United States Navy, large numbers of which it supplied during the war.

The Boston Elevated Railway Co. has ordered 30 one-man fireproof surface cars from the J. B. Brill Co., Philadelphia, and is in the market for 40 all-steel elevated and thirty steel center entrance multiple unit surface cars.

The Paragon Motor Car Co., with a reported capital of $3,000,000, has been organized at Connellsville, Pa., and it is said will build a large plant in that city for the building of motor cars.

Machinery Markets and News of the Works

PRICES ADVANCING

Nearly All Lines of Machine Tools Go Up

Business Exceptionally Good, So Active in Fact as to Arouse Fear of Over-expansion

Prices of nearly all lines of machine tools have been advanced from 10 to 15 per cent or more, and it is indicated in some quarters that prices will go still higher if production costs continue to show an upward incline. One line of shapers has been advanced 30 per cent. A Central Western builder of turret lathes and screw machines last week put up prices 15 per cent. A maker of vertical boring mills made an advance of 10 per cent. These are but indications of the trend of prices; a large proportion of standard tools have been similarly advanced since the first of the year.

Machine-tool plants are, as a rule, booked with orders sufficient for three months to six months operation. Certain types and sizes of machines are to be had for prompt delivery, but as a general rule these are not the machines which are most in demand. Business in the first month of the new year has been so good that in some quarters there is a degree of apprehension lest the present conditions be symptomatic of over-expansion rather than a normal, healthy growth.

Buying is quite general the country over. There is an enormous number of small orders. At the same time there are buyers whose purchases during the past month have run into the hundreds of thousands of dollars.

At Chicago the Worthington Pump & Machinery Corporation has placed additional orders for its Cudahy, Wis., plant, bringing its total purchases up to about $100,000.

Cleveland reports a very active trade. The General Motors Corporation has bought 50 multiple spindle drilling machines. The Cleveland Tractor Co. has bought 15 multiple spindle drilling machines and 10 radial drills. The demand from the East for automatic screw machines is exceptionally good, makers of talking machines and pianos being conspicuous in the inquiry for this type of equipment. An Eastern graphophone company has purchased from 40 to 50 automatics from a Cleveland manufacturer. The Otis Steel Co. has a large inquiry out at Cleveland for cranes for its new sheet mill plant.

The Oakland Motor Car Co., Pontiac, Mich., a subsidiary of the General Motors Corporation, will build three additional factory units to cost $2,500,000. This company has bought 30 lathes at Cincinnati and other equipment will be required.

A representative of an English motor car company is visiting machine-tool plants, having been at Cincinnati last week, and is reported to have an appropriation of $1,000,000 for machine-tool equipment alone.

The New England market is active. Buying is mostly in small lots, but several large projects are pending. Walden-Worcester, Inc., Worcester, Mass., has bought $120,000 worth of automatic equipment. The Stevens-Duryea Co., Chicopee, Mass., is buying and its affiliated interest, Rauch & Lang, Inc., is moving its equipment from Cleveland to Chicopee and is expected to require more machines. The General Electric Co. has placed a number of verbal orders for tools for its Lynn, Mass., works. The Rolls-Royce Co. of America, Springfield, Mass., has bought a few machines.

The General Electric Co., Schenectady, N. Y., continues to buy in New York for its Rochester plant. The Willys Corporation, Elizabeth, N. J., is placing more orders and the Wright Aeronautical Corporation, which will erect a new plant in Newark to manufacture Wright-Hispano airplane engines, is buying equipment, mostly second-hand.

New York

NEW YORK, Feb. 3.

The machine-tool market continues fairly active, orders for tools coming mainly from those companies which have been active buyers for several weeks past. There is a demand for single tools and small lots from scattered sources. The General Electric Co. and the Willys Corporation continue to buy. The Wright Aeronautical Corporation is buying equipment, mostly second-hand, for its plant to be built in Newark.

Industrial activities in central and northern New York State are expanding at an unprecedent rate and large purchases of machine tools have resulted. One of the largest of the new projects is a manufacturing plant being built at Syracuse, N. Y., for the Syracuse Washing Machine Corporation. The total cost of buildings and equipment is about $1,000,000. The Ford, Bacon & Davis Corporation, 111 Broadway, New York, is in charge of construction and purchasing. Most of the equipment has been bought. The General Railway Signal Co., Rochester, N. Y., will also make washing machines and motors and has bought some machine-tool equipment. The Rochester Motor Co., Rochester, which is making automobile engines and crankshafts, is building an extension, for which new equipment is being purchased. The Herschel-Spillman Co., North Tonawanda, N. Y., will soon build an extension of its plant to increase largely its output of four-cylinder automobile engines. The Farrel Foundry & Machine Co., Ansonia, Conn., is buying for its new plant at Buffalo, which was recently purchased from the Fore River Shipbuilding Corporation. The Niagara Machine & Tool Co., Buffalo, is erecting an addition, for which equipment is being bought. The Brown-Lipe-Chapin Co., Syracuse, has added to its equipment in order to increase its output of automobile gears. The Clark Bros. Co., Olean, N. Y., manufacturer of oil well machinery, will come into the market soon for machine tools. The McIntosh & Seymore Corporation, Auburn, N. Y., manufacturer of steam engines, is planning on a large expansion. Work will probably be begun in the spring. The Railway Roller Bearing Co., Syracuse, is getting into production, having been experimenting for some time past, and is expected to come into the market for machine tools. G. W. Tiffany, treasurer of the U. S. Roller Bearing Co., 213 Ellicott Square, Buffalo, has announced that his company will build a plant in that city for the manufacture of roller bearings. The first unit will have a capacity of 8000 bearings a day. The Corning Glass Co., Corning, N. Y., has bought machine tools for its Corning plant and is also equipping a new plant in Tennessee. Latest reports concerning the much talked of Ford project on Green Island, Troy, N. Y., are that the automobile manufacturer will use his property there for the manufacture of self-propelled electric street cars. It is stated that plans for the plant have been prepared and that work will be begun in the spring.

Crane sales and inquiries continue about the same as during the past two weeks. Sales of locomotive cranes continue good. The Cunard Steamship Co., which will build a terminal at Weehawken, will not be in a position to inquire

for cranes and other material handling machinery for several months.

The Standard Oil Co. is inquiring for several hoists for shipment to Rumania. Other inquiries are: The Hedden Iron Construction Co., South Elizabeth, N. J., in the market for a 10-ton, 60-ft. span, overhead traveling crane; the Federal Shipbuilding Co. of New Jersey in the market for a 5-ton, 26-ft. 10-in. span overhead traveling crane; and the Nichols Copper Co., Laurel Hill, L. I., in the market for nine 5-ton cranes through the J. G. White Engineering Co. Three are 30-ft. 3-in. span, one 27-ft. span, one 35-ft. span and four 18-ft. span.

The Shepard Electric Crane & Hoist Co. has sold the Montreal Locomotive Co., Montreal, Quebec, a 2-ton overhead traveling crane; the Standard Steel Car Co., twelve 2-ton electric hoists. The Chisholm-Moore Mfg. Co. has sold the Empire Zinc Co., a subsidiary of the New Jersey Zinc Co. in New Mexico, an 8-ton hand power crane. The following cranes have been placed by the Champion Engineering Co.: The Monahan Stone Co., Newark, N. J., a 15-ton, 64-ft. span overhead traveling crane; Armour Fertilizer Works, Chrome, N. J., one 10-ton, 100-ft. span bucket crane and one 5-ton, 57-ft. span bucket crane, and two 10-ton, 77-ft. 6¾-in. span bucket cranes, for Baltimore, purchased by Westinghouse, Church, Kerr; St. Louis Coke & Chemical Co., Granite City, Ill., a 15-ton, 48-ft. span crane; the Columbia Tire & Rubber Co., Columbiana, Ohio, one 15-ton, 58-ft. span overhead traveling crane; the Weirton Steel Co., Weirton, W. Va., one 20-ton, 56-ft. 3-in. span overhead traveling crane; Dominion Steel Products Co., Brantford, Ont., a 10-ton, 81-ft. span and a 20-ton, 46-ft. 1½-in. span, overhead traveling crane; Best Steel Castings Co., Oakland, Cal., a 5-ton, 40-ft. span overhead traveling crane. The Eastman Kodak Co., Rochester, N. Y., has purchased one 40-ton and one 50-ton overhead traveling crane from the Morgan Engineering Co. The Prudential Oil Co., New York, has purchased of the Brown Hoisting Machinery Co. a 25-ton, 60-ft. boom locomotive crane. The Mechanicsville Sand & Gravel Co., Mechanicsville, N. Y., which has been in the market for a 15-ton locomotive crane, has purchased one second-hand.

The G. Piel Co., 29 Thirteenth Street, Long Island City, manufacturer of machinery, has awarded a contract to J. C. Lyons & Sons, 2010 Broadway, New York, for a six-story reinforced-concrete plant, 150 x 200 ft., to occupy the block bounded by Washington and Pierce avenues, Seventh and Eighth streets. It will cost about $450,000.

The O. J. Childs Co., 138 Liberty Street, Utica, N. Y., manufacturer of fire extinguishers, is having plans drawn for a one and two-story addition, 160 x 200 ft.

The Famous Oven Mfg. Co., New York, has been incorporated with a capital stock of $75,000 by C. Coan, E. and S. Morris, 110 West Forty-second Street.

The American Iron Products Co., 107 Liberty Street, New York, has increased its capital stock from $100,000 to $200,000.

The Charles V. Haas Co., 509 East Eighteenth Street, New York, has leased a new machine shop and boiler works to be erected at 512-24 East Nineteenth Street by the Standard Gas Light Co., 130 East Fifteenth Street, at a cost of about $15,000.

The Riviere Brass & Bronze Co., 241 West Twenty-third Street, New York, has increased its capital stock from $25,000 to $50,000.

The Nichols Copper Co., Laurel Hill, Long Island, N. Y., has acquired property, 50 x 112 ft., adjoining its works near Borden Avenue for expansion.

The General Electric Co., Schenectady, N. Y., has had plans prepared for a six-story addition, 54 x 219 ft., to cost about $400,000.

The Liberty Brass Turning Co., New York, has been organized by M. Brothman and M. Keller, 14 East Second Street.

The Automatic Fly Catcher Corporation, New York, has been incorporated with an active capital of $120,000 by J. M. Herzberg and W. H. Elsteins, 2 Rector Street, to manufacture metal specialties.

Henry Hessner & Son, 33 Bartlett Street, Brooklyn, manufacturers of wagon parts, etc., have completed plans for a one-story plant, 159 x 200 ft., at McKibben and White streets, with cost estimated at $50,000.

The Fermor Utilities Corporation, New York, has been incorporated with a capital stock of $125,000 by H. N. Steinfeld, H. E. Hacker and W. H. Cooper, 1482 Broadway, to manufacture motor appliances, etc.

The E. G. Mfg. Co., 250 West Fifty-fourth Street, New York, manufacturer of automobile equipment, has increased its capital stock to $100,000.

The New Jersey Zinc Co., 160 Front Street, New York, is planning the immediate construction of zinc oxide and lithopone plants in Pennsylvania and Colorado, as extensions to its works.

Walter D. Watson, 295 Quail Street, Albany, N. Y., is having plans prepared for a seven-story automobile service and repair plant on Central Avenue, to cost about $100,000.

The Amalgamated Phonograph Accessories Corporation, New York, has been incorporated with a capital stock of $50,000 by S. Heckler and W. Brand, 12 East Forty-second Street, to manufacture spring motors, etc.

The plant of the Ford Motor Co., Jackson Avenue, Long Island City, comprising an eight-story, reinforced-concrete building totaling about 500,000 sq. ft. of space and held at $2,100,000, has been acquired by the Goodyear Tire & Rubber Co., Akron, Ohio, to be used in connection with its eastern operations.

The Paramount Reamer Co., New York, has been incorporated with a capital stock of $30,000 by L. Cooke, G. S. Moore and R. Landwehr, 498 Broome Street, to manufacture taps, dies, reamers, etc.

The Adriance Machine Works, 80 Richards Street, Brooklyn, has filed notice of reorganization with an active capital of $215,000.

Frederick Hart & Co., 835-41 Main Street, Poughkeepsie, N. Y., manufacturers of machinery, have increased their capital stock to $150,000.

The Karbo Bronze Foundries, Inc., Brooklyn, has been incorporated with a capital stock of $20,000 by J. M. Plummer, N. McGlashan and C. M. Stevenson, 60 Seabring Street.

The Palo Co., 90 Maiden Lane, New York, manufacturer of laboratory equipment, has acquired the twelve-story building, 60 x 99 ft., at 153-57 West Twenty-third Street, for a new plant. S. Schimmel is president.

The Galvanizing Corporation of America, 252 Eagle Street, Brooklyn, has increased its capital stock from $36,000 to $120,000.

The Bureau of Yards and Docks, Navy Department, Washington, has had plans prepared for a new electric power plant and system at Lakehurst, N. J., to cost $550,000.

The Clinton Foundry Co., Clinton, N. J., has been incorporated with a capital stock of $200,000 by Frank Latimer, Clement Le Boutillier and J. Philip Exton.

H. Boker & Co., Inc., 101 Duane Street, New York, manufacturer of iron and steel products, has arranged for the immediate erection of its proposed plant on Burnett Avenue, Hilton, N. J., to cost about $300,000. The initial structures will comprise a three-story works, 70 x 135 ft.; two one-story shops, 65 x 136 ft., and 55 x 70 ft., respectively; and a two-story storage building, 40 x 110 ft.

The tile department of the C. Pardee Works, Perth Amboy, N. J., will build a one-story addition, 110 x 200 ft. The company has been operating a second plant at Boston, Mass., and it is proposed to remove this works to Perth Amboy.

C. R. Newman & Sons, Inc., Passaic, N. J., has been incorporated with a capital stock of $100,000 by Charles R. Roland and Chester L. Newman, to manufacture electrical products.

The Magor Car Co., Athenia, N. J., is having plans prepared for a one-story power plant to cost about $35,000.

The Raritan Foundry Co., Raritan, N. J., has had plans prepared for a one-story foundry addition, 100 x 110 ft., on Milltown Road. A. P. Grimm is vice-president.

The Long Branch Mfg. Co., Long Branch, N. J., has been organized to manufacture machinery and parts. Max Rodin and Barnett Cohen head the company.

The Waclark Wire Co., Bayway and South Front streets, Elizabeth, N. J., has been acquired by the American Copper Products Co., a new organization formed under Delaware laws. The new owner will continue the operation of the plant for the manufacture of copper wire and other copper specialties, and plans a general expansion. George E. Matthies and F. S. Jerome, president and vice-president, respectively, of the new company, are connected with the Seymour Mfg. Co., Seymour Conn., manufacturer of brass, bronze, nickel, etc. William F. Heroy is treasurer, and William J. MacMillan, secretary.

The Bound Brook Oil-less Bearing Co., Bound Brook, N. J., plans to increase its capacity close to 100 per cent this year.

The Communipaw Co., foot of Jersey Avenue, Jersey City, N. J., formerly the Communipaw Steel Co., has filed plans for a one-story addition to cost about $5,000.

The Board of Freeholders, Freehold, N. J., has arranged for a new power plant on Main Street, Freehold, to cost about $40,000.

The Air Reduction Co., 175 Pacific Avenue, Jersey City, N. J., manufacturer of acetylene welding and cutting equipment, is planning for a new four-story plant to cost about $120,000. It is understood the structure will be located in the vicinity of Camden.

The General Lead Batteries Co., 4 Lister Avenue, Newark, N. J., is having plans prepared for a five-story, reinforced-concrete plant at Lister Avenue and Chapel Street, to cost about $150,000. Timmis & Chapman, 315 Fifth Avenue, New York, are the architects.

The Orange Sheet Metal Works, 7 Jefferson Street, Orange, has filed notice of organization. Peter J. Mergler, 85 Calley Road, West Orange, heads the company.

The General Alloy Co., 117 Walnut Street, Newark, N. J., has filed plans for a two-story plant at 188-190 New Jersey Railroad Avenue, to cost $12,000.

The Wright Aeronautical Corporation of America, New Brunswick, N. J., recently organized, is having plans prepared by John W. Ingle, 527 Fifth Avenue, New York, architect, for a new one-story plant, 100 x 360 ft., at Frelinghuysen and Meeker avenues, Newark, N. J., to cost $300,000 including equipment.

The S. & L. Tool & Die Co., 72 Berkshire Place, Irvington, Newark, N. J., has filed notice of organization. Peter J. Schorner, Spring Street, Millburn, heads the company.

The Demayo Engineering Corporation, New York, has been incorporated with a capital stock of $1,200,000 by G. E. Coblens, F. Nelson and G. B. Holbert, 29 Broadway, to manufacture hoisting and conveying machinery for coal, sand, gravel, etc.

The Electrical Materials Corporation, Albany, N. Y., has been incorporated with a capital stock of $50,000 by J. J. Haggerty, K. F. Ruthenberg and J. D. Hoit, to manufacture electrical specialties.

The Lauraine Magneto Co., 1765 Broadway, New York, has acquired a factory, 100 x 150 ft., on Thirteenth Street, near Van Alst Avenue, Long Island City, for a manufacturing plant.

The J. E. Steinmeirer Bronze Works, New York, has been incorporated with a capital stock of $25,000 by L. M. and J. E. Steinmeier and E. H. Fitch, 2694 Valentine Avenue, to manufacture brass and bronze products.

The B. & C. Mfg. Co., 294 Church Street, New York, has had plans prepared for a five-story plant at 290 Church Street, for the manufacture of bicycles and parts.

The Multiple Storage Battery Co., Van Wyck Avenue, Jamaica, N. Y., has increased its capital stock from $50,000 to $200,000.

Authorization has been made for additions to the present plant of the Universal Can Co., Binghamton, N. Y., which will permit the increase of their output from 600,000 cans per day to 850,000. Additional power required will be taken from Binghamton Light, Heat & Power Co.

The Larrabee Deyo Motor Truck Co., Binghamton, N. Y., has recently arranged to increase its capacity the coming spring. Power will be taken from Binghamton Light, Heat & Power Co.

The Utica Domestic Appliance Co., Utica, N. Y., has been incorporated with a capital of $10,000 by M. A. Owens, C. C. Croll and L. J. Horrigan, to manufacture electrically operated equipment.

The West Star Iron Works, New York, has been organized by S. Wasser and A. Weiss, 950 Leggett Avenue, Brooklyn.

The Superior Carbon Products Co., Poughkeepsie, N. Y., has been incorporated with a capital of $150,000 by M. E. Northrop, E. C. Hastings and H. B. Vosburg.

The Empire State Engine Co., New York, has been organized by J. F. Jacobs and W. H. Callahan, 111 Broadway, to manufacture engine parts, heavy hardware, etc.

The Century-Plainfield Tire Co., 902 North Avenue, Plainfield, N. J., is considering the erection of a one- and two-story addition, 60 x 80 ft., to cost about $25,000.

The Art Steel Co., New York, has been incorporated with a capital stock of $25,000 by S. H. Kahn, A. Scheinhaus and A. Burger, 49 East 106th Street.

The East Thirty-second Street Garage Corporation, 874 Sixth Avenue, New York, is planning for a two-story automobile service and repair works, 90 x 96 ft., at 145-151 East Thirty-second Street, to cost about $50,000.

The Houston Die & Tool Mfg. Co., New York, has been organized by H. Sharcoff and A. Wachs, 415 East Houston Street, to manufacture tools, dies, etc.

Catalogs Wanted

Saker & Bromberg have bought the business of Duck & Co., Haifa, Palestine, agents for hardware and agricultural machinery, and they desire catalogs, samples, etc. They refer to the Anglo-Palestine Co., Ltd.; at Haifa, their banking concern.

New England

BOSTON, Feb. 2.

Predictions of good buying early this year are borne out. The amount of business booked in January ran well ahead of that for December, and while orders for one, two or three machines predominate, larger lists are looked for within a week or two. Following closely on the advance in planers, has been an upward revision in quotations on lathes, presses and general equipment, shapers being among the most recent to advance.

The demand for equipment is general, although lathes, planers, shapers and milling machines are the most active. In screw machines and automatic tools, much of the buying represents repeat orders. Buyers of tools last October, November and December are anxious for deliveries, but the movement of all kinds of equipment into New England has been checked by freight embargoes, local labor troubles and winter weather. Since last reports the General Electric Co., Lynn, has given verbal orders for quite a number of tools, but these have not been verified in writing. The company is negotiating for the purchase of a Vermont plant. The Worthington Pump & Machinery Corporation, Boston, and the United Shoe Machinery Co., Beverly, have not yet made purchases on their 1920 lists. The Rolls-Royce Co. of America, Inc., Springfield, Mass., has bought five machine tools and has inquiries out for automatic screw machines and quite a lot of other equipment. The Stevens-Duryea Co., Chicopee, Mass., also has placed orders for a small amount of equipment and is interested in more. Rauch & Lang, Inc., formerly of Cleveland, and now of Chicopee, will soon move its equipment from Cleveland and will be obliged to buy more, but has not made up its list. The board of directors is virtually the same as that of the Stevens-Duryea Co. and the company's product, or at least a part of it, will be turned out in the Stevens-Duryea plant, but it is a separate corporation. Paul Frank, president, and Roy Deering, factory manager, are now at the Stevens-Duryea quarters. The Fore River Shipbuilding Corporation, Quincy, Mass., needs equipment, but has made up no list as yet. The Boston & Albany Railroad is expected to issue a list of tools in the near future. The Crofoot Gear Works, Cambridge, has not covered its new plant requirements. The Lowell Electric Light Co., Lowell, Mass., wants a 24 in. by 12 or 14 ft. lathe, a milling machine and a shaper. The Woburn Gear Works, Woburn, Mass., is making inquiries on a small amount of screw and other automatic machines, and the Osgood Bradley Car Co., Worcester, Mass., also is interested in similar tools.

The Rogers Forging Co., Worcester, has bought a lathe and shaper and is in the market for prompt shipment of two presses. It contemplates the erection of a new power plant. The Walworth Mfg. Co., Boston, wrenches, etc., has bought two lathes and wants a small amount of additional equipment. Baxter D. Whitney & Son, Winchendon, Mass., woodworking machines, has bought new lathes and a miscellaneous lot of second-hand equipment, but has not covered its full requirements. The Northway Motors Co., Natick, Mass., is buying some equipment all the time, and contemplates making pleasure cars as well as trucks. C. W. Inches, formerly with the Trego Motors Co., New Haven, Conn., is the purchasing agent. Walden-Worcester, Inc., Worcester, Mass., wrenches, etc., has placed orders for about $120,000 worth of Gridley automatic tools, also a lathe, shaper, etc. The Mason Regulator Co., Boston, is out of the market for the time, having recently covered its immediate needs. The Fiberbone Co., Inc., Waltham, Mass., is buying some equipment to make production machines. The company bought the old Metz plant on Rumford Avenue, and manufactures hard fibers as well as articles made from its product. The Beach Mfg. Co., Boston, fasteners, has bought equipment, having doubled its floor space. The Century Co., Holyoke, Mass., washing machines, has covered its requirements. The Golding Mfg. Co., Franklin, Mass., presses, recently placed orders for a few tools.

Stone & Webster, Boston, are in the market for five cranes, for Lowell, Long Island, and other plants. The Bridgeport District Salvage Board offers for sale by negotiation, 12 Maris Brothers single beam bridge cranes, 16 ft. span, 7 ft. lift, 1000 lb. capacity, motor driven; and 14 Curtis Co. reciprocating hoists.

The Trimount Mfg. Co., Roxbury, Boston, Trimo wrenches, contemplates the erection of a new plant within a few months.

John Bath & Co., Inc., Worcester, Mass., grinding machinery, precision tools and gages, is planning factory expansion as soon as weather conditions permit. It has enough orders for some of its product to operate at capacity the next eighteen months.

The Granite State Needle Co., Laconia, N. H., has been organized for the manufacture of knitting machine needles and plans to operate a factory in the O'Shea Building, Depot Square.

The Edison Electric Illuminating Co. of Boston has bought a large tract of land on the Fore River, Quincy, Mass., opposite the plant of the Bethlehem Shipbuilding Corporation, Ltd. Plans call for the erection of a large steam power generating station, but actual construction is not contemplated for several months.

The interests which bought the Atlas Tack Co., Fairhaven, Mass., have formed a New York corporation and plan to materially increase the production of the plant. It is four months behind on deliveries. The directorate in the new company includes W. F. Donovan, president; C. G. Bancroft, vice-president; W. M. Butler, Harry C. Dodge, Clifton H. Dwinnell, Ralph Hornblower, R. W. Atkins, Matthew C. Brush and N. A. Middleton.

Arnold & Co., New Britain, Conn., are planning the erection of a one-story brick structure, 42 x 90 ft., for foundry purposes.

The Fore River Shipbuilding Corporation, Inc., Quincy, Mass., will soon award a contract for the construction of a three-story combination shop, 50 x 220 ft.

Plans are being drawn for an extension to the Crosby Steam Gauge & Valve Co.'s Charlestown foundry.

Lockwood, Greene & Co. have been selected as engineers for the $500,000 factory and power house for the Ansonia O. & C. Co., Ansonia, Conn.

A contract has been awarded by the Yale & Towne Mfg. Co., Stamford, Conn., for the construction of a six-story factory, 50 x 202 ft.

F. L. Jenckes, Jenckes Spinning Co., Pawtucket, R. I., and associates are to build a $1,000,000 automobile tire-fabric plant near Montreal, which will give employment to 1000 hands. It will be operated along American lines.

The Old Colony Tool Co., Taunton, has been incorporated under Massachusetts laws to manufacture machinists' and mechanics' tools, appliances and apparatus, in a factory on Tremont Street, near Washington, covering an area of about 60 x 225 ft. It is capitalized for $95,000, or 950 shares, par $100 each, of which Ralph L. Lincoln, 10 Spring Street, president, and Jerome W. Lincoln, 8 Spring Street, treasurer, own 367 shares each. James Boyd, 6 Fogg Road, South Weymouth, owns 66 shares. These three constitute the board of directors.

The Standard Safety Mfg. Co., Inc., New Haven, Conn., has been incorporated with a capital of $60,000 by E. C. Regan, C. F. Oswald and S. C. Morehouse, to manufacture safety devices for machinery.

The Yale & Towne Mfg. Co., Stamford, Conn., has awarded a contract to the American Concrete-Steel Co., 27 Clinton Street, Newark, N. J., for the erection of a six-story, reinforced-concrete addition, 50 x 202 ft., to cost about $360,000.

The additions to the plant of the Gilbert & Barker Mfg. Co., Springfield, Mass., manufacturer of gas generators, oil-burning equipment, pumps, etc., will comprise a 400 ft. extension to the iron and brass foundry; addition to zinc galvanizing works; one-story addition, 160 x 229 ft., to sheet metal works; addition to power plant, and two extensions to the storehouses. The expansion is estimated to cost close to $1,000,000, including equipment.

The Continental Wood Screw Co., Mt. Pleasant Street, New Bedford, Mass., is taking bids for the erection of a two-story addition, 52 x 80 ft., with extension 30 x 40 ft., to cost about $45,000.

The Worcester Machine Works, 25 Bartlett Street, Worcester, Mass., is planning for an addition to its plant to provide about 50,000 sq. ft. of manufacturing area.

The Kelley Tire & Rubber Co., New Haven, Conn., is completing plans for the erection of its proposed new three-story and basement plant on a five-acre site on Elm Street, recently acquired. The first floor will be equipped with heavy machinery, such as mills, calenders, etc. The second floor will be used for the manufacture of cord tires and the third floor will be equipped for the production of tubes. The works will cost approximately $650,000. E. J. Kelley is president, and Charles H. Bortell, Jr., vice-president and treasurer.

The H. B. Ives Co., New Haven, Conn., maker of builders' hardware, etc., which recently increased its capital stock from $100,000 to $300,000, is contemplating the erection of another plant building in the near future to provide greater capacity.

Philadelphia

PHILADELPHIA, Feb. 2.

The Westminster Machine Works, 5623 Vine Street, Philadelphia, is taking bids for a one-story brick machine shop at Fifty-eighth Street and Westminster Avenue.

The James H. Billington Co., 113 Chestnut Street, Philadelphia, manufacturer of mill equipment, has filed plans for rebuilding its plant on North Randolph Street, recently damaged by fire.

The Universal Motor Agency, 3438 Ludlow Street, Philadelphia, is taking bids for a two-story service and repair works, 75 x 214 ft., to cost $50,000.

The Pruyn Co. of America, 4410 Paul Street, Philadelphia, has been incorporated in Delaware with capital of $1,000,000 by Howard C. Pruyn, W. H. Breman and Albert B. Morrow, to manufacture automotive products.

An addition will be erected to the power plant at the works of the George W. Blabon Co., Nicetown, Philadelphia, to double the capacity. The company will expend about $500,000 for extensions to its plant, and install considerable mechanical equipment, including oven apparatus, drying machinery, oxidizing oil equipment, machinery for handling plastic materials, etc.

The Franklin Process Co., Drexel Building, Philadelphia, with headquarters on Promenade Street, Providence, R. I., manufacturer of machinery for dyeing, has arranged for the erection of a new two-story plant, 75 x 103 ft., on a local site, to cost about $45,000.

The Zee Zee Rubber Co., Yardville, near Trenton, N. J., manufacturer of automobile tires, has increased its capital stock from $1,000,000 to $5,000,000.

Charles Hart, Delaware River Steel Co., Chester, Pa., is in the market for gas producer apparatus probably in connection with the Penn Seaboard Steel Corporation consolidation, noted on page 344 of THE IRON AGE of Jan. 29.

The Allen Typewriter Co., Tenth and Turner streets, Allentown, Pa., is planning the establishment of a larger plant to increase its output to 150 machines a day. In connection with a factory at New York, the company is now producing about 100 typewriters per day. James K. Bowen is head.

Effective Jan. 31, the Benjamin Iron & Steel Co., Hazleton, Pa., has closed its foundry for an indefinite period, or until production warrants the present cost of operation. About 50 men are affected.

The Fibre Specialty Co., Kennett Square, Pa., will build a one-story plant, 180 x 200 ft., at Cedar and Meredith streets, to cost $65,000.

A power plant will be erected by the Blossburg Hospital, Blossburg, Pa., to cost about $15,000.

The Connell-Erben Body Corporation, Scranton, Pa., has been incorporated with a capital stock of $50,000 by Edgar W. Connell and Lewis Erben, Scranton; and E. D. Morse, Clarks Summit, Pa., to manufacture automobile bodies.

The Hillone Coal Co., Scranton Life Building, Scranton, Pa., is having plans prepared for a new coal washery at Gordon, Pa., to cost $25,000. F. P. McLaughlin is general manager.

The Lehigh Machine Co., Lehighton, Pa., is planning to devote a large portion of its works to the manufacture of printing machinery, contract for which has been secured from the Russian Government. The company is building a one-story machine shop addition, 40 x 160 ft.

The Grohman Motor Mfg. Co., East Greenville, Pa., has been incorporated in Delaware with capital stock of $500,000 by Frederick W. E. Grohman, Oliver R. Derr and John S. Derr, to manufacture motor trucks.

The Carpenter Steel Co., Reading, Pa., has broken ground for a one-story addition, 74 x 109 ft. In connection with alterations in an existing building, the structure will cost about $45,000.

The Lehigh Light & Power Co., Allentown, Pa., has perfected plans for an addition to its power plant at Hauto, increasing the capacity from 30,000 to 60,000 hp. A battery of 18 boilers will be installed, with two electric generators, etc.

The Scranton Stove Works, Jefferson Avenue, Scranton, Pa., is planning for a three-story addition, 50 x 90 ft., to cost $75,000.

The Hubley Mfg. Co., Elizabeth Avenue, Lancaster, Pa., manufacturer of iron and steel castings, machinery, etc., is having plans prepared for an addition to cost $20,000.

The Keystone Screw Co., Fuller Building, Philadelphia, has moved its manufacturing plant at Yardley, Pa., to provide enlarged facilities. It is now installing additional equipment.

Pittsburgh

PITTSBURGH, Feb. 2.

The Liquid Carbonic Co., Thirty-first Street and Kedzie Avenue, Chicago, manufacturer of soda fountain equipment, has acquired property, 200 x 225 ft., at Preble Avenue and Westhall Street, Pittsburgh, Northside, and plans a new brick and steel plant, to which it will remove its local factory on Winebiddle Street.

The Allegheny Tank Car Co., Warren, Pa., has been incorporated in Delaware by Claire W. Hardy and associates, with a capital stock of $1,250,000 to manufacture tank cars and other iron and steel products.

Nicholas P. Perkins, Inc., Charleston, W. Va., has been incorporated with a capital stock of $30,000 by Nicholas P. Perkins, L. A. Tinder and Calvin C. Redden to manufacture machinery parts, metal equipment, and operate a general machine works.

Following the acquisition of the properties of the Pittsburgh-Franklin Coal Co., near Sutton, W. Va., the Westmoreland-Fayette Coal & Coke Co., Greensburg, Pa., is planning the installation of machinery, electrical and other equipment to cost about $150,000. The property comprises the Heffner and Knight mines, in the Gilmer Station section. E. W. Ilett is manager.

The Wheeling Sanitary Enameling Co., Wheeling, W. Va., is planning for the resumption of operations at its local plant, which has been idle for the past few years.

The new extension to the Sisterville Tank & Boiler Works, Sisterville, Va., will require a machinery installation estimated to cost $40,000.

The Wheeling Machine & Welding Co., Main and Twentieth streets, Wheeling, W. Va., has filed notice of change of name to the Wheeling Machine Products Co., at the same time increasing its capital stock to $50,000. The company specializes in the manufacture of welding equipment, patterns, dies, jigs, etc. Albert L. Doepkin is president.

The Hill Motor Co., Welch, W. Va., will build a four-story service and repair works, 75 x 150 ft., to cost about $100,000 including equipment.

The Howe Co., Wheeling, W. Va., operating a machine shop and repair works, is installing equipment for cylinder grinding, etc. A tool and parts department is also operated.

The Phillips Tool Co., Mannington, W. Va., manufacturer of oil-well tools and machinery, is planning an addition to double the capacity.

Baltimore

BALTIMORE, Feb. 2.

Fire recently destroyed the electric power plant of the Eastern Rolling Mills Co., Baltimore, with damage estimated at $40,000. It will be rebuilt.

Theophilus White, real estate broker, Baltimore, has had tentative plans prepared for clients for the erection of a seven-story manufacturing and storage building at Key Highway and Webster Street, which will cost about $1,000,000 and contain 225,000 sq. ft. of floor space.

The Baltimore Electrical Supply Co., 309 North Calvert Street, Baltimore, manufacturer of electrical equipment, has acquired property, 70 x 100 ft., at Calvert and Pleasant streets, for a new five-story plant.

The Sterno Corporation, Baltimore, recently incorporated with a capital of $500,000 by interests connected with the United States Industrial Chemical Co., the United States Industrial Alcohol Co. and the Curtis Bay Copper & Iron Co., all of Curtis Bay, is planning the erection of a large plant in this section for the manufacture of alcohol-burning devices for automobile service, electric heating and cooking devices. The proposed works with equipment are estimated to cost in excess of $400,000. Patrick H. Loftus, William D. Tucker and Stewart M. Seymour are incorporators. Carl Haner, Jr., connected with the United States Industrial Alcohol Co., is active in the new company.

Officials of the Reus Brothers Co., 146 West Mount Royal Avenue, Baltimore, manufacturer of piston rings, etc., have organized the Reus Electric Equipment & Battery Co., with a capital stock of $100,000, to manufacture electrical equipment. Burkhart Reus, John F. Reus, Jr., and S. Wilson Morrow head the company.

The C. E. Hosbach Co., 10 North High Street, Baltimore, manufacturer of auto bodies, wagon parts, etc., has increased its capital stock from $100,000 to $200,000.

The A. C. Layman Machine Co., Eleventh and Lombard streets, Wilmington, Del., manufacturer of leather machinery, has increased its capital stock from $10,000 to $100,000.

Organization of the Globe Shipbuilding & Drydock Co., Baltimore, has been perfected with capital of $5,000,000 to establish a new shipbuilding plant at Fairfield, as recently announced in THE IRON AGE. The company has acquired an 8000-ton drydock from the Savannah Drydock & Repair Co., Savannah, Ga., and this will be removed to the Fairfield site. A series of machine shops and construction buildings will be erected, with marine railway, wharves and other facilities. B. C. Cooke is president, Frank Miller, secretary, and James McKellar, general manager.

The Sawyer Specialty Scales Mfg. Co., Jacksonville, Fla., has been organized to operate the local plant of the W. H. Sawyer & Sons Co., Americus, Ga., manufacturer of revolving scales, baling machinery, etc. The factory now operated is of temporary character, and a new permanent works will be erected at a later date.

The Diamond Holdfast Rubber Co., Atlanta, Ga., manufacturer of rubber products for automobile service, is planning for a manufacturing plant to cost over $1,000,000. It has recently increased its capital to $2,500,000. H. L. Diamond is president.

The Walker Machine & Foundry Corporation, Roanoke, Va., has been incorporated with $25,000 capital stock. Charles M. Walker is president and J. W. Goff, secretary.

The Southern Shipyard Corporation, Newport News, Va., has increased its capital stock from $200,000 to $600,000.

The Southern Steel Products Co., Richmond, Va., will receive quotations on shears.

The Chowan Railway & Power Co., Murfreesboro, N. C., will build a generating station and desires prices on equipment.

Prices on machine tools are wanted by J. C. Hardin & Co., Rock Hill, S. C. Plans are being considered for the construction of a repair shop.

The Star Can Co., Hartsville, S. C., has been organized to manufacture metal cans. C. W. and D. R. Coker and C. K. Dunlap are stockholders.

With capital of $125,000 the Ajax Foundry & Machine Co., Anniston, Ala., has been organized by F. G. Carrington and others. Plans are being made to build a plant.

The Central Foundry Co., Anniston, Ala., will build an addition, 120 x 200 ft., and install machinery. E. P. Cooper is manager.

The Dixie Brass & Foundry Co., Sixth Avenue, Birmingham, Ala., will build a plant and install cupola, crane, etc. Charles Wegelin is manager.

The Preston Motors Corporation, First National Bank Building, Birmingham, Ala., plans works for the manufacture of automobiles, 300 x 700 ft., of steel and concrete. R. A. Skinner is president and manager.

Detroit

DETROIT, Feb. 2.

The contract for construction of the new Federal Drop Forge Co.'s plant in Lansing, Mich., has been let to the Christian Construction Co., South Bend, Ind. The main shop will be 60 x 120 ft., with a building 60 x 140 for the die, trimming and inspection departments. Other buildings will also be erected, and it is expected to have the plant ready for operation by May 1. A force of 150 will be employed at the start. The company is capitalized at $400,000. A. B. Shuart, Ottawa, Canada, will be factory manager.

Work has been started on the foundry and machine shop additions for the Novo Engine Works, Lansing, Mich., which are to be completed within 60 days. The foundry addition will be 120 x 200 ft. and the machine shop, 90 x 280 ft., which will increase the floor space by 50,000 sq. ft. It is proposed to increase the foundry output to a daily capacity of 75 tons. The total cost of the addition, with equipment, will be about $250,000. The company now employs about 700.

The Clark Equipment Co., Buchanan, Mich., manufacturer of the Celfor drill, Clark steel wheel and Clark trucktractor, will build its new plant for manufacturing Clark internal gear drive axles for motor trucks in Battle Creek, where a site comprising 23 acres has been obtained. Two buildings, 160 x 1200 ft., will be erected. The Buchanan plant will be used entirely for the manufacture of drills and steel wheels as soon as the Battle Creek plant can be put in operation.

The Oakland Motor Car Co., Pontiac, Mich., a General Motors subsidiary, has plans drawn and materials contracted for to build three additional factory units, which will cost in the aggregate about $2,500,000. One of the units will take care of the assembling expansion, where the future production schedule calls for 40 cars an hour.

The Hayes-Ionia Co., manufacturer of automobile bodies, Grand Rapids, Mich., will erect a two-story addition to its plant at Seventh Street and Muskegon Avenue, to cost $160,000.

The proposed additions to the plant of the Clarage Fan Co., Kalamazoo, Mich., manufacturer of blowers, engines, etc., will consist of two one-story buildings, the first, 28 x 170 ft., to form an extension to the foundry, and the other, 50 x 60 ft., as an addition to the pattern shop. The structures, with equipment, will cost about $100,000.

The Lincoln Motor Co., Detroit, has arranged for a stock issue aggregating $6,250,000 for additional working capital and proposed extensions. The works comprises about 55 acres of land and during the war operations were devoted to the manufacture of Liberty motors. A new automobile, to be known as the Lincoln, will be manufactured. Henry M. Leland is president and Wilfred C. Leland, vice-president and general manager.

The Transue & Williams Steel Forge Corporation, Alliance, Ohio, manufacturer of automobile axles, etc., is planning for the erection of a new plant at Marysville, Mich.

The Detroit Grey Iron Foundry Co., Wight Street, Detroit, will build a two-story addition, 135 x 150 ft.

Harrison Brothers, 45 Catherine Street, Detroit, structural steel jobbers, etc., are in the market for a good second-hand punch and shear.

The Detroit Tool Co., Detroit, manufacturer of the Detroit centerless cylindrical grinder and the Detroit semi-automatic five-spindle drilling machine, will build additions to meet the increased demand for its products since the war. The plant has been operating 24 hr. a day since the middle of last year. H. W. Holmes is president.

The Homer Furnace Co., which recently moved from Homer to Coldwater, Mich., has begun operations in its new plant, three months ahead of the time stipulated by contract.

The Plain & Castellated Nut Co., Jackson, Mich., recently organized, is expected to begin operations within a few days in a plant formerly occupied by the Perfection Coil Spring Co.

The Blackmer Rotary Pump Co., Petoskey, Mich., will make its own castings as soon as a foundry that is now being built is completed.

The Commerce Truck Co., Detroit, has purchased two more acres of land adjoining its plant and will build another addition as soon as the present one is completed.

The plant of the Melling Forging Co., Lansing, Mich., was destroyed by fire last week, with an estimated loss on building and contents of $20,000.

The Ypsilanti Screw Co., Ypsilanti, Mich., is considering plans for expansion. S. E. Crawford has been elected president and general manager.

Cleveland

CLEVELAND, Feb. 2.

The General Motors Corporation is still a heavy buyer of machinery and the past week placed an order through a local house for 50 multiple spindle drilling machines, totaling close to $300,000. Deliveries are to be made in three to four months. Among other good-sized orders is one placed by the Cleveland Tractor Co. for about 25 machines, including 15 multiple spindle drilling machines, the remainder being radial drilling machines. The market, generally, is very active, many orders being placed for single machines or small lots. A very good demand for automatic screw machinery has sprung up recently in the East, particularly from manufacturers of talking machines and pianos. One maker of graphophones placed an order with a Cleveland manufacturer for 40 to 50 automatics. The demand for these machines from the automotive industry in the Central West continues brisk.

The call for traveling and locomotive cranes continues very good. A large inquiry for electric traveling cranes has come from the Otis Steel Co., Cleveland, for its new sheet mill plant.

The Fisher Body Ohio Co., which was organized some time ago to build a plant in Cleveland, has acquired a 40-acre site at Coyt Road and East Fortieth Street and will erect a six-story main building with 1,500,000 sq. ft. of floor space. It is said that this will be the largest automobile body plant in a single unit in the world. A power house will also be erected.

The Zanesville Malleable Co., Zanesville, Ohio, is planning a $100,000 extension to its works which calls for the immediate erection of a temporary structure, 50 x 118 ft. to care for present needs. This will be replaced during the summer by a permanent building, 110 x 200 ft., increasing the present capacity about 50 per cent.

The Packard Electric Co., Warren, Ohio, maker of transformers and other electrical equipment, will erect an addition.

The Seneca Wire & Mfg. Co., Fostoria, Ohio, has under consideration extensions to its works and in this connection is planning an issue of $500,000 in preferred stock.

The Ohio Steel Foundry Co., Lima, Ohio, will erect a foundry, 600 ft. in length, in addition to other extensions now under way, and another building to be occupied as a general service room.

The Erie Truck Co., Erie, Pa., will build a new plant and will require some equipment for assembling work.

The Mansfield Vitreous Enameling Co., Mansfield, Ohio, has been organized and will build a one-story enameling plant, 100 x 100 ft. It is stated that its product will be used largely by Mansfield stove companies.

The Youngstown Steel Car Co., which is building a new plant in Niles, Ohio, has increased its capital stock from $1,000,000 to $5,000,000 to provide additional capital for present and future extensions. The main building, now under construction, is 240 x 400 ft. It is expected that the plant will be ready for operation about April 1.

The McElrath Tire & Rubber Co., Ravenna, Ohio, will begin the erection in the spring of a building, 90 x 320 ft., for the manufacture of tires.

The Lucius Mfg. Co., Massillon, Ohio, manufacturer of welded steel vaults, caskets and tanks, has increased its capital stock from $100,000 to $500,000 for the purpose of expanding into larger quarters. A new site will be selected within the next two months or so.

Buffalo

BUFFALO, Feb. 2.

The Bancroft-Jones Corporation, Mutual Life Building, Buffalo, manufacturer of portable steel factory buildings, has taken out building permit for a steel and tile fabrication building at Hubbard Street and the Pennsylvania Railroad.

The O. J. Childs Co., 138 Liberty Street, Utica, N. Y., has had plans drawn by H. E. Plumer, 222 Ellicott Square Building, Buffalo, for factory buildings, 160 x 200 ft., one and two stories.

The Brewer-Tichner Corporation, Binghamton, N. Y., has prepared plans for a factory for the manufacture of automobile tops, to be erected at an estimated cost of $150,000.

Plans are being drawn by the laFrance Fire Engine & Automatic Co., Elmira, for a plant addition 180 x 200 ft., one story, to cost $300,000.

The Thatcher Process Co., Syracuse, capitalized at $100,000, has been incorporated by B. I. Cooper, E. L. Robertson and J. D. Grant, to manufacture electrical, chemical and photographic apparatus.

The Auburn Ball Bearings Co. and the M. K. Knowlton Co., Rochester, N. Y., manufacturers of machinery, have acquired the three-story brick building on Industrial Street adjoining their works and are making extensive alterations.

The Precision Drill Grinding Co., has been incorporated with a capital stock of $10,000 to manufacture grinding drills. The directors are Harry A. May, Fred O. Bullis and Charles E. Hall.

The Geneva Auto Co., Geneva, N. Y., proposes to raze its building and erect on the site a building of 25,000 sq. ft. floor space. The new structure will contain a repair shop. L. A. Cooper is general manager.

The Ritter Dental Co. will add a story to its factory building at 404 West Avenue, Rochester, to cost $15,000.

George J. Gillies, representing Rochester capitalists, plans to erect a plant at Avon for the manufacture of tools, sheet-metal stampings and hardware novelties. It will be known as the Hosmer Mfg. Co. W. C. Clifford, purchasing agent of the Sherwood Shoe Co., Rochester, is president of the Hosmer company. Donald M. Lewis, Avon, is secretary.

The Simpson-Walther Lens Co., Ward Street, Rochester, will rebuild its plant seriously damaged by fire in December.

Foundry property which has been unoccupied in the village of Phelps since the Zenith Stove Co. ceased operations five years ago, was leased this week by George H. Parmalee. The plant will be overhauled and equipped for the manufacture of castings.

The Johnson Rim & Parts Co., 716 Ellicott Square Building, Buffalo, has let contract for the erection of a factory building, 60 x 180 ft., one story, at Delaware Avenue and the Erie Railroad, to cost $35,000.

Stockholders of the Lapp Insulator Co., Le Roy, N. Y., elected the following directors: C. L. Pierce, Jr., and George W. Provost, both of Pittsburgh; John B. Abbott, Geneseo, N. Y.; John S. Lapp, Le Roy, and Harlan W. Rippey, Rochester. The directors elected Mr. Pierce, president; Mr. Lapp, vice-president; Mr. Abbott, secretary, and Mr. Rippey, treasurer. The directors decided upon the construction of an additional building, the installation of new equipment and an increase of capital stock to $500,000.

The Buffalo Foundry, 747 Hertel Avenue, Buffalo, has awarded a contract to the Buffalo Structural Steel Co., 166 Dart Street, for a one-story addition, 70 x 100 ft., to cost $16,000.

The Jewett Refrigerator Co., 27 Chandler Street, Buffalo, has increased its capital stock from $100,000 to $300,000.

The United States Roller Bearing Co., Buffalo, occupying temporary offices at 213 Ellicott Square, and organized recently with a capital of $1,450,000, is negotiating for a local site for a new plant. Plans are being prepared for the first unit, affording about 40,000 sq. ft. floor space, to be equipped for a production of about 8000 roller bearings a day. It is planned to have the plant ready for operation early in June. G. W. Tiffany is treasurer.

The Niagara Pattern & Model Works, 1453 Niagara Street, Buffalo, will build a one-story brick and steel addition at Delavan and Niagara streets, to cost $23,000.

The Farrell Valve & Specialty Co., 110 Franklin Street, Buffalo, has filed notice of dissolution.

The Crescent Tool Co., 200 Harrison Street, Jamestown, N. Y., is having plans prepared for a one-story forge shop and power plant.

The Buffalo Tool & Supply Co., 40 Henry Street, Buffalo, has increased its capital to $50,000.

The Pierce-Brown Co., North Tonawanda, N. Y., recently incorporated with a capital stock of $350,000, has acquired property on Main Street, Tonawanda, opposite the works of the Donner Steel Co., aggregating about 10 acres, and plans an iron and steel foundry to cost about $200,000.

The Self-Lock Nut & Bolt Co., 190 North State Street, Chicago, has acquired property at East Syracuse, N. Y., and plans a new plant to cost about $400,000. R. W. Romaine, 208 Comstock Avenue, Syracuse, is interested in the project.

The Sargent & Greenleaf Co., 178 Court Street, Rochester, N. Y., manufacturer of hardware products, has awarded a contract to the Gorsline & Swan Construction Co., Powers Building, for a one-story plant at Joseph Avenue and Norton Street, to cost $200,000 including equipment.

Fire, Jan. 27, destroyed the automobile service and repair shop of the United States Garage, Erie, Pa., with loss estimated at $100,000.

The Rome Wire Co., Rome, N. Y., manufacturer of copper wire, etc., has increased its capital stock from $1,500,000 to $10,000,000.

The National Plier Co., Buffalo, recently incorporated, has established a temporary works at 67 Forest Street. Plans are under way for a permanent plant in this city for the manufacture of medium-priced pliers and other hardware specialties. Byron J. Erb is president and K. B. McDonald, vice-president.

Fire, Jan. 28, destroyed the foundry of Sweet Brothers, Johnson City, near Binghamton, N. Y., manufacturers of iron castings, with loss estimated at $50,000.

The Achilles Rubber & Tire Co., Binghamton, N. Y., is planning a two-story addition, 50 x 100 ft., for the manufacture of cord tires. This building will be constructed in the early spring and will be followed closely by another factory for tire and tube production. The extensions, with equipment, are estimated to cost over $750,000. Harry J. Smith is president and general manager.

The General Drop Forge Co., 1738 Elmwood Avenue, Buffalo, is having plans prepared for a one-story brick and steel forge-shop and heat-treatment addition, 40 x 120 ft., to cost $50,000.

The Farm Power Machinery Co., Rochester, N. Y., has been incorporated with a capital stock of $75,000 by F. C. Goodwin, T. E. Knowlton and I. J. Hargrave, to manufacture agricultural machinery.

The Barcalo Mfg. Co., Buffalo, N. Y., manufacturer of brass and iron beds, tools, etc., has decreased its preferred capital stock by $300,000, and immediately authorized an issue of $1,000,000 preferred, of which $600,000 is being sold. The purpose is to extend sales through establishing warehouses in various sections, and some equipment may also be added. The warehouses are for stocking spring and mattress lines, but stocks of tools will probably find their way there.

Cincinnati

CINCINNATI, Feb. 2.

While no large lists have been received the past week some very good orders were placed with local builders. The Oakland Motor Car Co. purchased 30 lathes from one concern, the Pennsylvania Railroad took two planers and several lathes for shops in this district, and a nearby motor company bought a number of small tools. Business from Pacific Coast points has been brisk. The Big Four is reported to have a list out for its shops at Beech Grove, but it has not yet made its appearance here, though one manufacturer of lathes has been asked for his best delivery on 12 tools.

An increase of 10 per cent was announced by a manufacturer on one line of drills and a lathe maker is reported to have advanced his prices to about the same level. Another lathe manufacturer, who recently raised his quotations, states that with the increased cost of labor and material, he will be forced to put another advance into effect in a short time. An increase in wages amounting to 10 per cent for molders will go into effect today, which will naturally affect the price of castings. A number of machine tool builders are contemplating an advance in prices and announcements are expected to be made shortly.

Despite the exchange handicap, an order was received from a British concern for a number of tools, including shapers and gear cutters. A representative of a British motor car company is now in this country buying equipment, and it is said that he has an appropriation of $1,000,000 for machine tools alone. South American business booked the past week included 10 lathes from Buenos Aires.

The Dunbar-Wood Engineering Co. has been organized with a capitalization of $1,000,000. The company has leased 25 acres of land, including two buildings, on East Thirty-second Street, Covington, Ky., and has started operations. It manufactures the Dunbar variable speed pulley, formerly built at Galesburg, Ill. Plans are under consideration for the erection of a foundry and machine shop. Arthur C. J. Wood is president.

The Reliable Tractor & Engine Co., Portsmouth, Ohio, contemplates moving its plant to Cincinnati. A number of sites are in view, and it is stated that the deal will be completed and construction of the new building started within 60 days. Christian Heer is president and general manager.

The Whipp Machine Tool Co., Sidney, Ohio, which recently acquired the business of the Sidney Power Press Co., has disposed of the press part to the Thomas Spacing Machine Co., Pittsburgh, which will continue the line. The Whipp company will devote its efforts to the manufacture of a line of shapers developed during the past year. The company has recently purchased some new equipment. P. C. Pocock, general manager, will continue with the Whipp company, and there will be no change in the personnel of the organization.

The United States Motor Truck Co., Covington, Ky., will increase its capitalization from $1,000,000 to $2,500,000. It is understood that plans are under way for additions to take care of its rapidly increasing business.

The Ferro-Concrete Construction Co. has been awarded the contract for the construction of the first section of the plant of the Sayers & Scovil Co., automobile manufacturer, Cincinnati. The buildings will be erected on Spring Grove Avenue, in Winton Place, and the contract calls for the erection of a four-story building, 80 x 350 ft. Tietig & Lee are the architects.

The Peerless Foundry Co., Cincinnati, has awarded the general contract for the construction of an addition, 125 x 130 ft., to its molding room, which will enable the company to increase its output about 50 per cent. The foundry now has a capacity of 500 tons of small castings a month. Work on the addition will start immediately.

Contracts have been let for the construction of a one-story forging building for the Irwin Auger Bit Co., Wilmington, Ohio.

The Millville Avenue branch of the Long & Allstatter Co., Hamilton, Ohio, was placed in operation last week. It will take care of the farm implement business of the company.

The Cannon Die, Tool & Machine Co., Columbus, Ohio, will move from its present location on West Gay Street to quarters being prepared in the Shields Power building at Lynn and Ludlow streets.

At the annual meeting of the stockholders of the Producers' Supply & Tool Co., Marietta, Ohio, it was voted to increase capital stock from $500,000 to $750,000, the additional capital to be used in financing extensions, plans for which are now being prepared. L. Ginsburg is president.

The Cincinnati Pulley Machinery Co. has changed its name to the Avey Drilling Machine Co., and will continue

the manufacture of the Avey line of drilling machines at its plant in Covington, Ky.

The Union Machine Co., 977 Logan Street, Louisville, Ky., is planning for the erection of a one-story addition. Joseph A. Ganz is head.

The Ahrens Fox Fire Engine Co., Alfred and Cook streets, Cincinnati, is completing plans for a three-story addition to its plant on Colerain Avenue, 44 x 74 ft., to cost about $75,000.

The Lunkenheimer Co., Waverly and Beechman streets, Cincinnati, manufacturer of valves, steam specialties, etc., is having plans prepared by F. D. Chase, Inc., engineer, 122 South Michigan Avenue, Chicago, for a new three-story plant at Carthage, Ohio, to cost in excess of $1,500,000.

The Newark Stamping & Founding Co., Newark, Ohio, has had plans prepared for a two-story plant, 50 x 125 ft., to cost about $25,000.

The Roderick Lean Mfg. Co., Mansfield, Ohio, manufacturer of agricultural machinery, has awarded a contract to the H. K. Ferguson Co., Euclid Avenue, Cleveland, for a two-story, brick addition, 80 x 480 ft., to cost about $200,000, including equipment.

Indianapolis

INDIANAPOLIS, Feb. 2.

Contract has been let to the H. G. Christman Co., South Bend, Ind., for building the first unit of the tractor plant for the Oliver Chilled Plow Co., of that city.

The Standard Motor Parts Co., Lebanon, Ind., is having plans drawn for a factory at Ballard Street and the Central Indiana Railroad.

The Hoosier Cab & Body Co., Middlebury, Ind., has been incorporated with 30,000 capital stock to manufacture automobile accessories. The directors are Milton L. Williams, Harry S. Dover and Fred S. Hixon.

The H. & D. Co., Crawfordsville, has been incorporated with $100,000 capital stock to manufacture shock absorbers. The directors are Dumont M. Peck, George H. Fosdick and Edward E. Ames.

The Washburn Burner Corporation has been incorporated at Kokomo, Ind., with $150,000 capital stock to manufacture acetylene burners. The directors are George H. Washburn, Harry M. Holden and E. H. Sutherland.

The Ripley Cultivator Co. has been incorporated at Holton, Ind., with $60,000 capital stock to manufacture tractor machinery. The directors are O. P. Shook, C. E. Holton and H. A. Cass.

The Peerless Machine Works, Muncie, Ind., has increased its capital stock from $10,000 to $50,000.

The contract for the construction of the first unit to be built at Logansport, Ind., of the Logansport Body Works has been let to Willard C. Price, of that city, at a cost of $22,000. There will be three units ultimately.

The Haynes Stellite Co., Kokomo, Ind., has increased its capital stock from $50,000 to $300,000. Extensive additions to the plant are contemplated. Elwood Haynes is president, and J. C. Patton, secretary-treasurer.

Louis Rastetter & Sons, Fort Wayne, Ind., manufacturer of novelties, are in the market for lathes, milling machines, shapers, drill presses, grinding machines and other equipment to thoroughly equip a shop for the manufacture and repair of machinery. R. W. Dick should be addressed.

The Marion Machine, Foundry & Supply Co., Marion, Ind., will soon commence the construction of an administration building and an additional foundry unit.

Chicago

CHICAGO, Feb. 2.

Practically all lines of tools have advanced from 10 to 15 per cent, and in some cases more. One line of shapers, for instance, has been marked up 30 per cent. January proved an exceptionally good month from a sales standpoint, and the recent advance in prices does not seem to be impeding current business. Buying, in fact, is so general that dealers are commencing to wonder whether it is not symptomatic of over expansion. There is little fear, however, of any decided reaction in the economic situation in the immediate future. Deliveries, in the main, range from three to six months, with most sellers complaining of accumulating back orders. The situation is no longer uniform, however, as one prominent dealer reports a substantial increase in shipments from manufacturers.

The Worthington Pump & Machinery Co., Cudahy, Wis., has placed additional orders which bring its total purchases up to about $100,000. The Miehle Printing Press & Mfg. Co. has bought part of the equipment it has been inquiring for, including a 42-in. x 42-in. x 10-ft. planer, a gang drill and a multiple spindle drill. The Illinois Steel Co. is reported in the market.

For the most part current purchases are for one or two machines at a time, large inquiries being exceptional. While consumers are very active, as would be expected from their interest in new equipment, some plants have been severely crippled of late by the influenza epidemic.

M. C. Rosenfeld, Cleveland, has purchased the works of the Winslow Brothers Co., on the Belt Railroad between Congress and Harrison streets, Chicago, and will immediately remodel and equip it for a large manufacturing business. The Winslow plant was formerly employed in the manufacture of ornamental iron and steel windows, and during the war manufactured shells. The buildings contain 200,000 sq. ft. of floor space.

The Flexible Steel Lacing Co., 522 South Clinton Street, Chicago, has purchased from the Chicago Fire Brick Co. the vacant land adjacent and west of the Belt Railroad between Lexington and Polk streets, containing 80,000 sq. ft., and will erect a one-story plant with 40,000 sq. ft. of floor space, which it will use for the manufacture of steel belt lacing. The improvements will cost $160,000.

The United States Government has purchased the third and last unit of three warehouses erected in Chicago during the war. This property, which comprises 159,000 sq. ft. of land and a six-story building, 318 x 500 ft., in Thirty-ninth Street, near Ashland Avenue, was occupied along with the other two structures by the Quartermaster's Department and is still used for storage purposes.

The Monighan Machine Co., 2036 Carroll Street, Chicago, is having plans drawn by Alfred P. Weber, 111 West Washington Street, for a one-story foundry, 100 x 150 ft., to be erected at Walton and Augusta streets.

The Chicago Pump Co., 900 West Lake Street, Chicago, is receiving bids on a one-story machine shop, 125 x 175 ft., at 2322 to 2336 Wolfram Street, to cost $65,000.

The Tuthill Springs Co., manufacturer of automobile springs, 760 Polk Street, Chicago, has awarded the general contract for a one- and two-story plant, 212 x 418 ft., at West Thirty-first Street and Kilbourn Avenue, to cost $200,000.

The John Erickson Can Co., 723 Fulton Street, Chicago, has let the general contract for a two-story plant, 35 x 120 ft., at 4612 West Ohio Street.

The Douglas Iron Works, 617 Aberdeen Street, Chicago, has let contracts for the construction of a one-story shop, 63 x 135 ft., at 1126-32 South Fairfield Avenue, to cost $16,000.

The Sall Brothers Pattern Works, manufacturer of wood and metal patterns, Rockford, Ill., has purchased a site on Kishwaukee Street, between Twenty-second and Twenty-third avenues, where they will build a modern shop this spring.

The Ludlum Steel Co., 122 South Michigan Avenue, Chicago, has leased a one-story building, 50 x 142 ft., which is being erected at 1238-40 Washington Boulevard, and will be used as an office and warehouse for tool steel.

W. H. Thomas, Spencer, Iowa, has purchased a tract in that city, where he will erect a plant for the manufacture of accelerators and dust caps for Ford automobiles.

L. S. Baldwin, Fred Grant and J. Chandler, employees of the United States Arsenal, Rock Island, Ill., are organizing the Davenport Forge Co., and are negotiating with the City Council, Davenport, Iowa, for the purchase of a site on ground west of Howell Street at the intersection with the Rock Island Railroad tracks.

Reichel & Drews, 559 West Lake Street, Chicago, will build a one-story machine shop, 100 x 170 ft., at 450 North Ashland Avenue, to cost about $35,000.

The Combination Fountain Pen Co., Decatur, Ill., is having plans prepared by Architect John A. Scribbins, Powers Building, for a one-story plant, 150 x 340 ft. It is proposed to commence erection in the early spring.

The Mid-West Metals Mfg. Co., Des Moines, Iowa, has been incorporated with a capital of $30,000 by D. E. Emanuel, Donald Harlow and Rex Fowler, to manufacture metal dies, stampings, etc.

The Hawkeye Tire & Rubber Co., 215 East Third Street, Des Moines, Iowa, has awarded a contract to the John M. Benson Co., Des Moines, for a new three-story plant at Eighteenth and Court streets, to cost about $300,000, including equipment.

The Wyman-Gordon Co., Worcester, Mass., manufacturer of forgings for automobile use, has acquired the plant and business of the Ingalls-Shepard Forging Co., Harvey, Ill.,

manufacturer of similar specialties, including crankshafts, steering knuckles, etc. The works will be continued at the same location and will be known as the Ingalls-Shepard Division of the Wyman-Gordon Co. Plans are under way for increasing the capacity of both plants.

The City Council, Fargo, N. D., is having preliminary plans prepared for the erection of a municipal electric light and power plant to cost about $150,000. Robert T. Jacobsen is city engineer.

The Maytag Co., Newton, Iowa, manufacturer of agricultural equipment, electric washing machines, etc., has arranged for the immediate erection of a four-story addition, 80 x 300 ft., to cost about $250,000, including equipment.

Milwaukee

MILWAUKEE, Feb. 2.

Machine tool business booked by local shops in January reached a larger volume than that of any month of 1919, and was materially larger than the corresponding month a year ago. Orders consist almost entirely of single tool requirements, with no large lots, but business is coming in such a steady stream that the aggregate is of large proportions. Local shops are booked up for from four to five months and deliveries are being extended every week. This is particularly true of milling machines.

Doelger & Kirsten, 505-509 Cedar Street, Milwaukee, have broken ground for a one-story brick and steel machine shop, 90 x 200 ft., at Fifth and Cedar streets, which will increase their capacity for manufacturing alligator shears and other metal cutting and punching equipment.

The Luther Grinder Mfg. Co., 285 South Water Street, Milwaukee, manufacturer of grinding machines and tool grinders, has undergone a change in ownership. The controlling interest has been acquired by William T. Hardy and Capt. W. E. V. Shaw. Mr. Hardy was elected president and general manager, and Capt. Shaw, secretary-treasurer, at the annual meeting last week.

The P. B. Yates Machine Co., Beloit, Wis., manufacturer of heavy wood-working machinery, will award contracts about Feb. 15 for the construction of a new gray iron foundry, 206 x 264 ft., of brick, steel and concrete, with steel sash. The work, with commensurate enlargement of the machine shops, is estimated to cost nearly $500,000.

The Wisconsin Die Casting Co., Milwaukee, sustained a loss of $10,000 by fire in its plant at Hubbard Street and Reservoir Avenue on Jan. 28. Repairs and replacements will be made immediately. Gustave R. Hintz is president.

The John Scholtz Sheet Metal Works, Milwaukee, on Feb. 1 moved to new and larger shop quarters at 1823 Vliet Street.

The Plymouth Foundry & Machine Co., Plymouth, Wis., will increase its capital stock from $65,000 to $130,000 to finance the construction and equipment of additions during the year. W. R. Holling is president.

The Gehl Brothers Mfg. Co., West Bend, Wis., manufacturer of agricultural implements and machinery, is installing a considerable list of additional machine tools, including a Davis turret lathe, riveting machine, quick-acting punch press and other tools. The production of ensilage cutters will be increased materially.

The Prairie du Chien Tool Co., Prairie du Chien, Wis., has filed articles of incorporation with a capital stock of $50,000. It will manufacture machine tools, machinists' tools, and other mechanical appliances. The incorporators are W. R. Graves and E. C. Amann.

The Topp-Stewart Tractor Co., Clintonville, Wis., at its annual meeting determined upon a production of 350 to 400 machines for 1920, compared with 100 machines in 1919. A new issue of $250,000 of 8 per cent preferred stock will be made to finance the purchase of additional equipment, materials, etc. Edward T. Boland is factory manager.

The Economy Carburetor Co., Milwaukee, has amended its articles to provide for an increase in capital stock from $50,000 to $75,000. A larger output is being arranged for.

The Safety Steering Gear Co., Superior, Wis., has been incorporated with a capital stock of $100,000 to manufacture devices for motor vehicles, tractors, etc. M. E. Benson is the principal incorporator.

The Interstate Drop Forge Co., Milwaukee, a recent incorporation, has increased its authorized capitalization from $50,000 to $250,000.

The Wetmore Reamer Co., 210 Sycamore Street, Milwaukee, manufacturer of machine tools, cutters, etc., has increased its capital stock from $50,000 to $75,000. Paul W. Rogers is secretary and treasurer.

The Baker Mfg. Co., Evansville, Wis., has increased its capital stock from $750,000 to $1,600,000. It manufactures gas engines, windmills, pumps, tanks, feed grinders and other farm and dairy equipment. Plans for extensions of the foundry and machine shops are in preparation.

The Associated Manufacturers Corporation, 60-64 Third Street, Milwaukee, has increased its capital stock from $50,000 to $75,000.

The Badger Metal Ware Co., Milwaukee, is the name of a new corporation organized with a capital stock of $200,000 by Louis S. Wiener, Harry R. Kuntz and M. A. Landeck to manufacture steel, aluminum and copper utensils.

The Murray-Myirea Machine Co., Antigo, Wis., is increasing its foundry and machine shop force about 25 per cent to handle its enlarged business.

The Schartow Mfg. Co., Racine, Wis., manufacturer of saddlery hardware and other metal specialties, has let the general contract to C. B. Danielson, 638 Mineral Street, Milwaukee, for the construction of its new plant in South Milwaukee. It will be of brick and mill construction, one story and part basement, 91 x 310 ft. The corporation is affiliated with the Stowell Co., malleable founder, South Milwaukee.

The Kohler Co., Kohler, Sheboygan County, Wis., has broken ground for a one-story brick and steel gray iron foundry addition, 220 x 300 ft. A new engineering building, 130 x 262 ft., is being completed. The company manufactures enameled sanitary ware.

E. T. McGeehan, De Pere, Wis., is taking bids for the erection of a two-story fireproof public garage, machine shop and warehouse, 72 x 120 ft. H. W. Carr, Green Bay, Wis., is architect. The work will cost $25,000.

The Six Wheel Truck Co., Fox Lake, Wis., incorporated several months ago with $60,000 capital, has completed experimental work and is ready to engage in quantity production of motor trucks with four driving wheels and a patented automatic differential lock. A shop costing about $30,000 will be erected and equipped early in the spring. F. N. Pettegrew is president.

The Latex Tire Co., Fond du Lac, Wis., which on Feb. 1 took occupancy of its new factory, will build a second unit, two stories, 50 x 200 ft., in the spring. B. E. Mehner, local architect, is in charge.

The Fort Howard Paper Co., Green Bay, Wis., has broken ground for its new mill and power plant, 100 x 100 ft., two stories and part basement, of brick and reinforced concrete. The general contractor is the Ludolf M. Hansen Co., Green Bay.

St. Louis

ST. LOUIS, Feb. 2.

The Newburger Cotton Co., Memphis, Tenn., will equip a compress plant to cost about $100,000 at Ashdown, Ark.

The Ash Grove Light & Power Co., Ash Grove, Mo., is in the market for about $30,000 worth of machinery to replace its burned plant.

The American Bakers' Machinery Co., St. Louis, will equip 60,000 sq. ft. of floor space for machinery manufacture.

The Century Electric Co., St. Louis, will equip a $500,000 addition to its plant for the manufacture of electric motors.

The W. H. Moore Lumber Co., Hot Springs, Ark., 625 Central Avenue, will install an engine, conveyor and other mechanical equipment in a $50,000 plant at Lawrence, Ark.

The Whitaker-Glessner Co., Wheeling, W. Va., will equip a sheet metal specialty manufacturing plant at Kansas City, Mo.

The Schleuter Mfg. Co., St. Louis, will equip a four-story factory, 70 x 110 ft., for the manufacture of metal specialties.

The Johnson City Foundry & Machine Co., Johnson City, Tenn., is in the market for a 42-in. x 42-in. x 18-ft. planer.

The Lookout Boiler Mfg. Co., Chattanooga, Tenn., recently incorporated with a capital of $100,000, is planning for the construction of a one-story plant, 100 x 200 ft., for the manufacture of boilers, tanks and kindred products. J. M. Webster, H. H. Peck and Leo Strahle head the company.

The Preston Motors Corporation, First National Bank Building, Birmingham, Ala., recently organized to manufacture automobiles, has plans under way for a one-story plant, with main unit 350 x 700 ft. It is proposed to develop an output of about 2500 motor cars per annum at the works. An electric power plant will be constructed. R. A. Skinner is president and manager.

The W. B. Knight Machinery Co., 3920 West Pine Street, St. Louis, is completing plans for the erection of a one-story and basement addition, 75 x 152 ft., to cost about $40,000.

The Western Foundry & Sash Weight Co., Second and Miller streets, St. Louis, has completed plans for a one-story foundry, 97 x 100 ft., on Stein Street, to cost about $12,000.

Texas

AUSTIN, Feb. 2.

The Bellville Cotton Oil Co., Bellville, is preparing to install equipment for an electric light and power plant, with the view of furnishing the town and private consumers with service. The company has increased its capital stock from $30,000 to $60,000.

The Brazos Boiler Works, Waco, has been incorporated with a capital of $50,000 and will build a plant. The incorporators are L. Dillon, Z. M. McCormick and J. E. Simmons.

The Sinclair Consolidated Oil Corporation, Fort Worth, plans to construct an 8-in. oil pipe line from the Monroe, La., oil field to Houston and to build a large pumping station at Manning, Tex.

The Snyder Utilities Co. has been incorporated at Snyder with a capital of $50,000. Its purpose is to construct and operate public utility plants at Snyder. The incorporators are D. P. Yonder, W. B. McCormick and E. P. Johnsen.

The White Pipe Line Co., Houston, which has been incorporated with a nominal capital stock of $100,000, will construct an oil pipe line from the central west Texas oil fields to Texas City at a cost of about $5,000,000. It is a subsidiary of the White Oil Corporation of Houston and New York. The incorporators of the new company are J. W. Colvin, H. F. Montgomery and C. E. Roberson, all of Houston.

The Armstrong Farm Tractor Co., Sweetwater, Tex., is planning for the erection of a new plant, for the manufacture of tractors, to cost about $130,000, of which about $100,000 will be expended for equipment. The initial building will be one-story of reinforced concrete, 100 x 200 ft. It is proposed to develop an initial capacity of about 15 machines a day, which will be doubled later. Ira Armstrong heads the company.

The Magnolia Petroleum Co., Dallas, is planning for the erection of a new refinery at San Antonio, to comprise five buildings, 30 x 600 ft. A. C. Ebie is manager.

Fire, Jan. 17, destroyed the cotton ginning plant of the Lewisville Gin Co., Lewisville, Tex., with loss estimated at $35,000.

Johnston Brothers, Amarillo, operating a machine works, will build a one-story addition, 60 x 80 ft., to be used as a machine repair works.

The Thurber Earthen Products Co., Thurber, capitalized at $600,000, will establish a new rock-crushing plant and limestone works at Ranger, with initial capacity of about 1000 tons a day.

The Hughes Tool Co., Houston, manufacturer of rock drills and other oil well tools, is planning for the construction of a one-story machine shop to cost about $20,000.

The Marshall Electric Co., Marshall, will build an addition to its electric power plant to cost about $85,000.

S. C. Creech & Co., Bay City, manufacturers of tractor parts and equipment, are planning for a new one-story plant, 50 x 100 ft.

Catalogs Wanted

The Peden Iron & Steel Co., Houston, with branches at San Antonio and Fort Worth, dealer in wholesale hardware and supplies, is adding to its lines machine tools and shop equipment. It is interested in manufacturers' catalogs and would like to receive copies for its files.

The Pacific Northwest

SEATTLE, Jan. 27.

Foundries and machine shops in this section are feeling the practical cessation of activities in steel shipbuilding. General business has been good, but the shops have depended upon shipyard work for so long that the loss of the greater portion of it finds some of them almost idle.

Lumber mills and camps are still greatly handicapped by the shortage of rolling stock. Despite the exceedingly high costs of building, there is heavy demand for lumber products and with a sufficient number of cars the industry would be in a very encouraging condition. Orders have been coming in heavily but as no definite date of delivery can be given, much of this business is lost.

The Britannia Wire Rope Co., Vancouver, B. C., has awarded to the Dominion Construction Co. contract for its proposed new plant, 120 x 200 ft. The buildings will cost $40,000 and the equipment to be installed about $85,000.

The Barrett Co., Ltd., Vancouver, B. C., manufacturer of roofing materials and building supplies, will erect an addition to its plant, to cost $12,000. New equipment will be installed.

The Washington Pulp & Paper Co., Port Angeles, Wash., is receiving bids for its proposed new pulp and paper mill to be erected in the near future.

The Mineral Lake Lumber Co., Mineral, Wash., will increase the capacity of its sawmill by the installation of considerable new equipment.

The Crawford Point Water, Light & Power Co., Salem, Ore., plans the construction of water works to supply the town of Cooston with water. The plant will cost about $75,000.

The Post Falls Box & Mfg. Co., Coeur d'Alene, Idaho, has been incorporated for $50,000 by C. R. Lambert, T. J. Russell and others, and will establish a box factory.

The George Harvey Lumber Co., Eugene, Ore., has purchased a large tract of timber land and will erect a sawmill with a daily capacity of 45,000 ft. J. D. Harvey is manager.

Otto and William Effenberger and Lee Parson, Woodburn, Ore., will immediately erect a sawmill and box factory with a daily capacity of 15,000 ft.

The Logging Equipment Mfg. Co., Vancouver, Wash., will erect a factory in that city for the manufacture of logging machinery. It is capitalized for $50,000.

Canada

TORONTO, Feb. 2.

P. H. Secord & Sons, 133 Nelson Street, Brantford, Ont., have the general contract for an addition costing $40,000 for the Dominion Steel Products Co., Morrell Street, Brantford.

The factory owned by the Richmond Paper Co., Hollis Street, Halifax, N. S., was destroyed by fire with a loss of $100,000. William M. Orr is manager.

The sawmill owned by Auger & Leslerc, Lotbiniere, Que., was destroyed by fire with a loss of $10,000. It will be rebuilt immediately and new machinery installed.

The Asbestos Mfg. Co., Drummond Building, Montreal, is in the market for one triplex pump and accumulator for 2500 lb. pressure, also a hydraulic press.

The Andrews Wire Co., Strathroy, Ont., will build an addition to its plant to cost $20,000.

The Nineteen Hundred Washer Co., 357 Yonge Street, Toronto, is in the market for a 4-spindle power feed drill; also one light multiple drill.

Jenkins Brothers, Montreal, are building a brick and steel addition to their plant, 80 x 192 ft., one story, with crane way and monitor, to cost $40,000. It will be used as a machine shop and with the addition to the present foundry and new core room, already completed, will increase the company's output of valves about 100 per cent.

The Western Canada Pulp & Paper Co., Ltd., Toronto, has been incorporated with a capital stock of $1,000,000 by John A. Kent, Room 43, 44 King Street West; Maxwell C. Purvis, 44 King Street West; Guy M. Jarvis and others, to manufacture pulp, pulp wood, paper, etc.

The Canadian Numbering Machine Co., Ltd., Toronto, has been incorporated with a capital stock of $50,000 by John S. Duggan, 6 Adelaide Street East; Thomas S. H. Giles, Craig A. St. C. McKay, 450 Walmer Road, and others to manufacture counting machines, speedometers, tools, machinery, etc.

The Sanitary Plumbing Co., Ltd., Ottawa, Ont., has been incorporated with a capital stock of $50,000 by Alan C. Fleming, William S. Mackenzie, Thomas W. Barnard and others to manufacture boilers, heaters, engines, plumbers' supplies, etc.

The Acme Burner & Heater Co., Ltd., Toronto, has been incorporated with a capital stock of $200,000 by Thomas H. Wilson, 506 Temple Building; Jacob W. Broudy, 3 Vankoughnet Avenue; Florance C. O'Leary and others to manufacture heating systems.

The General Top Co. of Canada, Ltd., Toronto, has been incorporated with a capital stock of $300,000 by William S. Morlock, 85 Bay Street; Sydney E. Wedd, 162 Jameson Avenue; Roy B. Whitehead and others to manufacture automobile tops, bodies, accessories, etc.

R. E. Callahan, Ltd., Toronto, has been incorporated with a capital stock of $350,000 by Jacob H. Greenberg, 24 King Street West; Garnet L. Ord, Walter G. Hammond, Room 11, 24 King Street West, and others, to manufacture electrical appliances, washing machines, etc.

The Hercules Rubber Goods, Ltd., Toronto, has been incorporated with a capital stock of $500,000 by Jacob H. Greenberg, 24 King Street West; Walter G. Hammond, Room 11, 24 King Street West; John D. Bradford and others to manufacture automobile tires and tubes, rubber goods, etc.

The Stansell Motors, Ltd., Amherstburg, Ont., has been incorporated with a capital stock of $500,000 by William R. Stansell and William F. Park, both of Amherstburg; John B. Whitley of Detroit, Mich., and others to manufacture motors, engines, automobile accessories, etc.

BOOK REVIEWS

Johnson's Materials of Construction. Rewritten by M. O. Withey and James Aston; edited by F. E. Turneaure. Fifth edition; pages XIX + 840; 6¼ x 9¼ in.; profusely illustrated. Published by John Wiley & Sons, Inc., New York.

Revised on the same broad scope of the original treatise, this fifth edition includes much data derived from experiment and investigation in the past few years. In addition to the information resulting from these researches, the contents of the volume have been rearranged to co-ordinate more closely related subject matter, the better to place it before students as a textbook and as a reference for engineers.

The synopsis of the principles of mechanics and materials, Chapter I, while more concise than former editions, is yet a comprehensive treatment of the mathematics of the science. A chapter on materials under combined stress, incorporated in the new volume, covers various stresses, biaxial loading, and the conditions determining elastic breakdown. In Chapter II on machines and appliances for mechanical tests, separate treatment is given these mechanisms and their operation, eliminating from Chapter III devoted to the mechanical testing of structural materials, such matter merely descriptive of these devices. In the chapters relating to the manufacture of iron and steel, both illustrations and matter have been revised in accordance with more recent practice, and a new chapter has been written outlining the methods of manufacturing iron and steel shapes, plates, sheet, pipe, wire, etc. The properties of composite members, the description of timber trees, the methods of microscopic analysis, and the magnetic testing of metals, have all been omitted, the editors considering that these subjects, while supplementary, are sufficiently well treated in other textbooks, and are therefore more properly displaced by the new data incorporated in this volume. This rearrangement has resulted in the evolution of a high-standard textbook of structural fundamentals.

Time Studies as a Basis for Rate Setting. By Dwight V. Merrick. Pages, xviii + 366, 6 x 9 in.; illustrations, 137. Published by Engineering Magazine Co., New York.

Evidently on account of the desire to prevent misunderstanding of the above title, there is placed in the book, a fly leaf ahead of the title page on which the title is amended to read, "Time Studies as a Basis for Rate Setting, As Developed in the Taylor System of Management." A foot note also appears on this fly leaf quoting from the writings of Taylor as follows: "Time study for rate setting is the means to attain the fundamental objects in manufacturing of high wages and low labor cost." In addition to this effort to interpret the title, there is a foreword by Carl G. Barth, who is perhaps the leading exponent to-day of the Taylor system, and a preface by the author.

It would seem as though these efforts at safeguarding such a publication as this are very much in order. "Time studies" is a much used expression to-day in industrial enterprises and a much abused one. To the average working man the expression is odious, and to the average manager or factory executive it defines a panacea for the sharply rising production labor costs so prevalent now. But lack of a true understanding of how both to obtain and apply time studies has prevented either the working man or the manager from obtaining the great benefits possible from scientific time studies, except in a few exceptional instances, and it is to be hoped that both the portion of industry represented by the working man and that represented by the manager will read sympathetically Mr. Merrick's book on the subject.

The book consists of two main sections and several short appendices. The first section deals with the principles, methods and implements of time study. It describes the necessary preliminary investigation of all the conditions which may affect the resultant study, tells how the actual study is made, how the actual data obtained are first analyzed and then checked, and finally how, after making all due allowances for conditions which affect the performance of a task, the task rate is formulated.

The second section consists of studies as applied to various representative machine tools. Here the author gives from his personal collection of many years, much data in the form of tables and illustrations and exact information as applied to many standard makes of machine tools. The publication of the data should result in the elimination of much duplication of effort on the part of industries which are establishing time study departments.

There are twelve appendices, the first and last of which are the important ones. The first describes a method of organizing a time study department and is based on the author's own experience of many years. The last treats on wage payment systems and describes comprehensively practically all the well known methods; as well as giving actual examples of their application. The other ten appendices describe briefly methods of filing and tabulating peculiar to the author and investigations of some special manufacturing processes as made by him. E. C. R.

Applied Science for Metal Workers. By W. H. Dooley. Pages x + 479, 5 x 7½ in.; numerous illustrations. Published by the Ronald Press Co., 20 Vesey Street, New York.

This book provides an elementary course in applied science for the metal trades and is written primarily so that the craftsman while learning his trade will master the scientific principles involved to the end that he may better understand the various operations which he performs. The book first covers the general principles of science common to all industry and then deals with that specifically relating to the metal trades. The arrangement is such that it may be used by science teachers in the regular secondary and technical schools and by science teachers in vocational schools.

The first 29 chapters are devoted to physics, chemistry, magnetism and electricity, the telephone and telegraph, strength of materials, common fastening agents, common hand-tools, transmission of power, boilers and the generation of steam, the steam engines, methods of heating, ventilation, and gas engines. The remaining eight chapters cover iron and iron molding, problems in pattern-making, the making and working of wrought iron, the making and working of steel, structural steel, machine shop practice, sheet metals, and plumbing.

The book is written in a clear and concise style. The difficult principles are explained in simple words and the interest of the student is maintained by leading him gradually from the elementary to the more difficult phases of the subject.

"Location of Flaws in Rifle-Barrel Steel by Magnetic Analysis" is the subject of scientific paper No. 343, issued by the Bureau of Standards. This paper describes an investigation of the application of magnetic analysis for the detection of flaws in rifle-barrel steel. Apparatus was specially constructed and a large number of bars were explored for magnetic uniformity along their length. The apparatus and tests are described and curves showing the results obtained are reproduced. The method, it is stated, is amply sensitive to detect and locate flaws. A copy of the paper may be obtained by addressing a request to the bureau.

"Metallurgical Patents" is the title of a pamphlet issued by the Chemical Foundation, Incorporated, 81 Fulton Street, New York. It gives a brief abstract of the various patents owned by the Foundation. They cover many processes in alloys, steel, iron, ores, etc.

Specifications for concrete molding floors were given by Hutton H. Haley, Sand Mixing Machine Co., New York, in a paper on "Concrete Foundry Molding Floors" presented before the recent convention of the American Foundrymen's Association, Philadelphia.

NEW TRADE PUBLICATIONS

Rolling Mill Machinery.—Philadelphia Roll & Machine Co., Twenty-fifth Street and Washington Avenue, Philadelphia. Catalog, series No. 1, pages 10¾ x 8½ in., enclosed in a cloth cover loose-leaf binder, and devoted to rolling mill machinery. The catalog is divided into sections as follows: Section 1, three-high bar and merchant mills; section 2, special mills, which include three-high mill with special screw down, two-high reversing mill and roll press; section 3, gear drives; section 4, two-high mills for iron or steel, brass and copper; section 5, cold strip mills; section 6, alligator shears; section 7, vertical billet shears; section 8, plate straightening machines; section 9, angle and shape straightening machines; section 10, mill tables; section 11, coilers; section 12, billet piercing machines; section 13, rolls. The mills, machines and rolls are all illustrated with full-page halftones.

Foundry Facings and Supplies, Fire Brick, Buffing Compositions, Platers' Supplies and Equipment.—Frederic B. Stevens, Larned and Third streets, Detroit. Catalog 1, 768 pages, 6 x 9 in., with stiff cover, for buyers of foundry facings and foundry supplies, fire brick, buffing compositions, platers' supplies and equipment. The contents include spacing mill and foundry materials; cupola room requirements; equipment and supplies for the foundry, cleaning room, core room and pattern shop, brass foundry equipment, fire brick and refractory material; buffing compositions, polishing room supplies and equipment; electro plating equipment and accessories. The book is profusely illustrated.

Valves.—Nelson Valve Co., Chestnut Hill, Philadelphia. Catalog 10, 156 pages, 5 x 7½ in., with cloth cover. Illustrates and describes an extensive line of bronze, iron and steel valves of gate, globe, check and non-return patterns.

Woodworking Machinery.—Baxter D. Whitney & Son, Inc., Winchendon, Mass. Catalog. Concerned with woodworking machinery, including belt or motor-driven double planer, single planer and shapers; direct motor-driven saw bench with tilting arbor; wood-scraping machines, and a cylinder grinding machine. The machines are illustrated.

Motor-Operated Brakes.—Cutler-Hammer Mfg. Co., Milwaukee. Booklet A. A 4-page leaflet which illustrates and describes motor-operated brakes for alternating current service on cranes, elevators, mine hoists and other conveying and hoisting machinery.

Drills, Reamers and End Mills.—Clark Equipment Co., Buchanan, Mich. Catalog 17, 127 pages, 5 x 7½ in. Lists and illustrates an extensive line of drills, reamers and end mills. The drills include high-speed twist, three fluted, four fluted, flat beaded drills, etc., track bits, flue sheet drills and countersinks. The reamers and end mills include chucking, bridge, car and rose chucking reamers; end, spiral end and center cut end mills. These tools are marketed under the trade name "Celfor."

Special Machinery.—Yoder Co., Cleveland. Catalog. Illustrates and describes a line of special machinery, which includes heavy duty crown rolling machines, strip wiring machines, forming machines, universal wiring machines, beading machines, rotary shears, power hammers, cold rolling machines, etc. Sheldon Co., 41 Park Row, New York, are agents.

Gas and Oil Furnaces.—Chicago Flexible Shaft Co., Chicago. Catalog 75, 80 pages, 8½ x 11 in. Concerned with an extensive line of gas and oil furnaces for the heat treatment of metals. The furnaces are made in oven, crucible and forge types. The catalog is illustrated.

Elevators and Conveyors.—Link-Belt Co., Chicago. Book 375, 108 pages, 6 x 9 in. Illustrates and describes freight and package handling machinery, including elevators, conveyors for bags, boxes, packages, barrels, etc., conveyors for canneries and miscellaneous materials, baggage and freight ramps, log conveyors, lifting hoists, overhead traveling cranes, portable loaders, locomotive cranes, carriers for coal, ashes, etc.

Files.—Nicholson File Co., Providence, R. I. Two catalogs, one of 32 pages, size 10½ x 8 in., the other of 92 pages, 6 x 5 in. Illustrate and describe an extensive line of files of various cuts and shapes. Another booklet, "File Philosophy," issued by this company, gives some hints regarding the proper methods of using files and the various applications of the most common files.

Magnetic Separators.—Cutler-Hammer Mfg. Co., Milwaukee. Booklet S. Illustrates and describes a magnetic separator, principally used for the removal of stray iron that would injure crushing, grinding or cutting machinery, for the recovery of iron for its intrinsic value, and for the purification of products.

Rolling Mill and Steel Works Machinery.—Youngstown Foundry & Machine Co., Youngstown. Catalog, 32 pages, 7½ x 11 in. Illustrates and describes a line of rolling mill and steel working machinery, also sand and chilled rolls. The machines include roll lathes, lever shears, vertical shears, spike machines, straightening machines and ingot cars.

Grinding Machines and Precision Tools.—Modern Tool Co., Erie, Pa. A series of bulletins devoted to grinding machines and precision tools as follows: Bulletin 31, chuck equipment; bulletin 32, self-opening die heads; bulletin 33, service bulletin and instruction sheet on self-opening die heads; bulletin 34, collapsible taps; bulletin CG, chaser grinders. A number of pages included with these bulletins are devoted to self-contained plain grinding machines, internal grinding machines and universal grinding machines. The tools and machines are illustrated.

Power Pumps.—F. E. Myers & Bro., Ashland, Ohio. Catalog PP-20, 142 pages, 6 x 9 in. Descriptions with illustrations of an extensive line of shallow and deep well power pumps.

Coal and Rock Drills.—Leetonia Tool Co., Leetonia, Ohio. Catalog 3, 75 pages, 8 x 10½ in. Devoted to coal and rock drills, miners' and roadmen's tools. The catalog is illustrated.

Bolts and Nuts.—Columbus Bolt Works Co., Columbus, Ohio. Catalog, 139 pages, 6 x 9 in. Lists, illustrates and describes a line of bolts and nuts, miscellaneous bolts and forgings for automobiles, and carriage forgings. A number of pages give weights of round, square and hexagon steel, contents of full kegs of bolts, standard dimensions of rivet heads, etc.

Electric Hoists and Overhead Cranes.—Link-Belt Co., Chicago. Book No 380, 99 pages, 6 x 9 in. Illustrations and descriptions of electric hoists, mono-rail trackwork for electric hoists, electric telphers, overhead traveling cranes and revolving locomotive cranes.

Grinding Wheels.—Norton Co., Worcester, Mass. Three booklets. A booklet of 45 pages, 5 x 8 in., deals with preventive and protective safeguards for grinding wheels, and modern devices which can be practically applied in the use of grinding wheels and machines. A 16-page booklet treats of storage, handling and supervision of grinding wheels. A 19-page booklet, form 254, is a safety code for the use, care and protection of abrasive wheels.

By-Product Coke and Gas Plants.—Koppers Co., Pittsburgh. Catalog, 67 pages, 7 x 10 in. Concerned with by-product, coke and gas plants. The history of the by-product coke oven and a description of the Koppers coke oven are given. The company's cross regenerative gas oven and combination coke and gas oven are described. The larger part of the catalog is devoted to by-product recovery methods. The direct process for the recovery of ammonium sulphate is described, also ammonia concentrating plants, coal and coke handling systems, and benzol recovery systems. The catalog is profusely illustrated, installations of the plants and systems being shown.

Reflectors for Industrial Plant Lighting.—Harvey Hubbell, Inc., Bridgeport, Conn. Catalog, 24 pages, 8 x 10½ in. Concerned with an extensive line of reflectors for industrial plant lighting. Various types of reflectors, reflector sockets and globe holders for mazda lamps are illustrated and described.

Machinery and Supplies.—Somers, Fitler & Todd Co., Pittsburgh. Booklet, 36 pages, 7 x 9¼ in., with the title "A Pictorial Visit to the House of Service." Photographs with text showing the company's facilities for handling machinery and supply trade.

Oil Engines-Diesel Type.—Allis-Chalmers Mfg. Co., Milwaukee. Bulletin 1537, 31 pages 8 x 10 in. Gives details of oil engines of the Diesel type, to be used for ordering repairs and spare parts. The parts are pictured with the name and purpose given.

Gages.—Taft-Peirce Mfg. Co., Woonsocket, R. I. Bulletin 109, 32 pages, 8 x 10½ in. Devoted to plug screw and snap gages, also special and thread milling cutters, all of which are illustrated.

Crushing, Grinding and Sifting Machinery.—Paul O. Abbe, Inc., 30 Broad Street, New York. Catalog F. Concerned with machinery for treating hard or soft materials by crushing, cutting, grinding pulverizing, mixing or sifting. The machines illustrated include ball and pebble mills, rotary cutters, mead mills, hammer mills, cage mills, bolting reels, mixers, disk grinders, etc.

Chains and Buckets.—Howe Chain Co., Muskegon, Mich. Catalog 100. Concerned with chains for heavy work and malleable-iron elevator buckets. The chains illustrated and described include straight line malleable detachable chain, closed end pintle chain, sawmill pintle chain, heavy closed end pintle chain, double locked chain, malleable-iron and steel combination chain, Ley bushed chain and malleable-iron roller chain. Elevator buckets of various shapes are listed and illustrated.

Graphic Records.—Esterline Co., Indianapolis, Ind. Booklet, 24 pages, 8½ x 11 in., with the title, "Typical Graphic Records." Describes graphic or curve drawing instruments, and shows reproductions of typical graphic records from the instruments in plants of some of the company's customers. The records reproduced include those taken from a 5-hp. motor, driving a bulldozer, from a heavy drawing press, a group grinder load record, plant power consumption records, billet mill load curves, power input and speed curves on mill motors, characteristic speed and current curves of bloom shear operation, power consumption of an electric furnace melting high speed steel, etc.

Fluid Meters for Low Pressure Gas and Air.—Bailey Meter Co., Cleveland. Bulletin 30. Illustrates and describes fluid meters for recording and integrating the rate of flow of gas and for recording gas pressure. Chart records reproduced measured the surplus gas produced in a by-product coke oven plant and delivered for city distribution, by-product coke oven gas delivered to heating furnace at a 2-high mill at a steel works, gas supplied to a heating furnace at a [illegible] gas supplied to the heating furnace at a

[illegible] **Packing.**—Safepack Mills, Boston. Booklet, with [illegible]tle, "Safe Packing." Concerned with the packing of material to protect against water, dampness, dirt, vermin, rough handling, etc. Shows how to use the company's various grades of [illegible]de-to-measure case linings; also shows how the compa[illegible]'s cordlined paper is made by inserting parallel cotton c[illegible]ds between two sheets of paper and cementing these sheets together with a special composition of waterproof asphaltum.

Foundry Equipment.—Whiting Foundry Equipment Co., Harvey, Ill. Five catalogs, 6 x 9 in. Catalog 146 illustrates and describes the company's standard cupola, a special cupola for continuous service, a test cupola, and discusses in detail the mechanical charging of cupolas. Descriptions of the company's charging machine, charging cars and water cinder mill and views showing cupola and charging machine installations are included. Bulletin 150 deals with a side blow converter and the equipment required. The construction and operation of the converter is explained and installations are shown. Catalog 148 is concerned with core oven equipment. Illustrations and descriptions are included of core ovens of various types, core oven racks, puller machine for core ovens, core maker's bench, cars and trucks and core racks. Equipment installations in customers' plants are shown. Catalog 147 deals with ladles, which include crane lades with various types of tilting devices, truck ladles, bottom tap ladles, teapot spout ladles, trolley ladles, shank ladles, car wheel ladles, etc. Catalog 149 is concerned with air hoists and elevators. Vertical and horizontal hoists of various types, trolleys, compressed air elevators and hydropneumatic elevators are described and illustrated.

Centrifugal Pumps.—Lea-Courtenay Co., Newark, N. J. Two bulletins. Bulletin H-4 is a treatise and catalog of an extensive line of centrifugal pumps. Bulletin S-5 is a synopsis of typical centrifugal pumps installed in various industries, tending to show the wide range of pumping service which the company's line of pumps cover.

Income Account Book.—Trussell Mfg. Co., Poughkeepsie, N. Y. Folder, the outside of which is made to resemble the company's book with the title, "My Finances." The book is classified and indexed for records and information regarding bonds, stocks, real estate, insurance, salary, etc. It is designed to show the total net income in detail and the sources. The book is made on the loose-leaf system.

Automatic Screw Machines.—P. W. V. Automatic Machine Corporation, Fitchburg, Mass. Booklet. Half-tones taken on the company's assembly floor of a 1-in. radial automatic screw machine, show the progressive assembly. The purpose is to show the simplicity of the machine.

Traction Elevators.—Warner Elevator Mfg. Co., Cincinnati. Bulletin. Illustrates and describes traction engines, slip ring motor, alternating current motor, direct current motor, direct current interpole motor, steel guide car, cages, direct current controller and alternating current controller.

Saddlery Hardware.—Moline Iron Works, Moline, Ill. Catalog 19, 133 pages, 5 x 7½ in. Lists, illustrates and describes an extensive line of saddlery hardware, including such items as buckles, blind irons, bits, clips, collar fasteners, hames, hooks, loops, trace carriers and supports, etc.

OFFICE CHANGES

The G. H. Williams Co., Erie, Pa., steel grab buckets, has opened an Eastern sales office at 30 Church Street, New York. H. F. Randall, who has been connected with the company for several years, is in charge.

The Cincinnati Pulley Machinery Co., Cincinnati, has changed its name to the Avey Drilling Machine Co. No change has been made in the stock or personnel of the organization.

The Parker Rust-Proof Co. of America, 15 Conant Road, Detroit, has removed to 623-645 Milwaukee Avenue, East, in Detroit.

The Kearney & Trecker Co., Milwaukee, manufacturer of Milwaukee milling machines, has moved its Cleveland office from 515 Garfield Building to larger quarters at 738 Superior Avenue, N. W. C. C. Bauschke, formerly the Ohio representative, having severed connections with the company to engage in a private business enterprise, C. J. Sturgeon has been appointed to the Ohio territory. Mr. Sturgeon was formerly with the W. M. Pattison Supply Co., Cleveland.

The Lakewood Engineering Co., Cleveland, has recently opened a district office at 6 Beacon Street, Boston, for the sale of its industrial equipment lines. This office is in charge of William Waring, who, for the last two years, has been connected with the Philadelphia and Washington offices of this company. This office is prepared to furnish the regular Lakewood industrial haulage service to New England manufacturers. The Lakewood construction equipment lines are handled in New England by the Waldo Bros. & Bond Co., 181 Congress Street, Boston, which is a combination recently formed by the consolidation of Waldo Bros., Inc., and the Harold L. Bond Co., the latter having handled Lakewood lines for several years.

T. A. Willson & Co., Inc., Reading, Pa., has established a permanent branch office in New York in the Bush Terminal Sales Building, Forty-second Street near Broadway. William Wortman is the new manager.

The Chicago Flexible Shaft Co., Chicago, has opened a New York office for the distribution and sales of its furnaces, forges and heat treating equipment at 350 Broadway, in charge of J. W. Lazear, formerly with the Brown Instrument Co., Chicago.

The Trumbull Steel Co., Warren, Ohio, has opened a sales office in Philadelphia at 532 Widener Building, in charge of J. B. DeWolf temporarily. Mr. DeWolf comes from the New York sales force of the company.

The importing and exporting companies of Cho Ito & Co. and the Ito Enterprising Co., both of Kobe, Japan, have consolidated under the name of Ito & Co., Ltd., with capital of 3,000,000 yen. The new company maintains offices at 150 Nassau Street, New York, in charge of S. Nakai, and in the L. C. Smith Building, Seattle, in charge of Y. Kabe.

Wheelock, Lovejoy & Co., Inc., handling special steels for all purposes, has opened its new Chicago warehouse. The company also has warehouses in Boston, New York and Cleveland. The Detroit office has been moved to 5 North La Salle Street, Chicago, and will in the future handle the territory comprising Michigan, Wisconsin, Minnesota, Iowa, Northern Indiana and Illinois.

The Franklin Tractor Co. has moved its offices from Franklin, Ohio, to Greenville, Pa., and has awarded a contract for the erection of a one-story factory building, 100 x 200-ft. in size. As soon as the building is completed, equipment will be installed for the manufacture of tractors.

The Busch-Sulzer Bros.-Diesel Engine Co., St. Louis, Mo., has opened an eastern sales office at 60 Broadway, New York, in charge of George D. Pogue and Stanley Wright.

Current Metal Prices

On Small Lots, from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general headings of "Iron and Steel Markets" and "Metal Markets."

Iron and Soft Steel Bars and Shapes

	Per lb.
Bars:	
Refined iron, base price	4.25c.
Swedish bars, base price	20.00c.
Soft Steel:	
¾ to 1⅞ in., round and square	3.52c. to 4.25c.
1 to 6 in. x ⅜ to 1 in	3.52c. to 4.25c.
1 to 6 in. x ¼ to 5/16	3.62c. to 4.35c.
Rods—⅝ and 11/16	3.57c. to 4.05c.
Bands—1½ to 6 by 3/16 to No. 8	4.22c. to 4.75c.
Hoops	4.47c. to 5.50c.
Shapes:	
Beams and channels—3 to 15 in	3.47c. to 3.90c.
Angles:	
3 in. x ¼ in. and larger	3.47c. to 3.90c.
3 in. x 3/16 in. and ⅛ in	3.72c. to 4.25c.
1½ to 2½ in. x ⅛ in	3.52c. to 4.05c.
1½ to 2¾ in. x 3/16 in. and thicker	3.47c. to 4.00c.
1 to 1¼ in. x 3/16 in	3.52c. to 4.45c.
1 to 1¼ x ⅛ in	3.57c. to 4.50c.
⅞ x ⅞ x ⅛ in	3.62c. to 4.60c.
¾ x ⅛ in	3.67c. to 4.65c.
⅝ x ⅛ in.	4.07c. to 5.00c.
½ x 3/32 in.	5.17c. to 5.70c.
Tees:	
1 x ⅛ in	3.87c. to 4.75c.
1¼ in. x 1¼ x 3/16 in.	3.77c. to 4.50c.
1½ to 2½ x 3/16 in. and thicker	3.57c. to 4.10c.
3 in. and larger	3.52c. to 3.95c.

Merchant Steel

	Per lb.
Tire, 1½ x ½ in. and larger	3.52c. to 4.25c.
Toe calk, ½ x ⅜ in. and larger	4.85c.
Open-hearth spring steel	7.00c.
Standard cast steel, base price	14.00c.
Extra cast steel	18.00 to 20.00c.
Special cast steel	23.00 to 25.00c.

Tank Plates—Steel

	Per lb.
¼ in. and heavier	3.67c. to 4.25c.

Sheets

Blue Annealed

	Per lb.
No. 10	5.07c. to 5.80c.
No. 12	5.12c. to 5.85c.
No. 14	5.42c to 5.90c.
No. 16	5.52c. to 6.00c.

Box Annealed—Black

	Soft Steel C. R., One Pass, per lb.	Wood's Refined, per lb.
Nos. 18 to 20	6.80c. to 8.80c.	
Nos. 22 and 24	6.85c. to 8.85c.	9.80c.
No. 26	6.90c. to 8.90c.	9.85c.
No. 28	7.00c. to 9.00c.	10.00c.
No. 30	7.10c. to 9.10c.	

No. 28, 36 in. wide, 10c. higher.

Galvanized

	Per lb.
No. 14	7.25c. to 9.00c.
No. 16	7.50c. to 9.25c.
Nos. 18 and 20	7.65c. to 9.40c.
Nos. 22 and 24	7.80c. to 9.55c.
No. 26	7.95c. to 9.70c.
No. 27	8.10c. to 9.85c.
No. 28	8.25c. to 10.00c.
No. 30	8.75c. to 10.50c.

No. 28, 36 in. wide, 20c. higher.

Pipe

Standard—Steel	Blk.	Galv.	*Wrought Iron*	Blk.	Galv.
⅛ in. Butt...	—36	—19	¾-1½ in. Butt.	—18	+2
¼-3 in. Butt.	—40	—24	2 in. Lap.....	— 9	+5
3½-6 in. Lap.	—35	—20	2½-6 in. Lap..	—11	+6
7-12 in. Lap..	—25	— 8	7-12 in. Lap...	+ 1	+19

Steel Wire

BASE PRICE* ON No. 9 GAGE AND COARSER	Per lb.
Bright basic	7.50c.
Annealed soft	7.50c.
Galvanized annealed	8.00c.
Coppered basic	8.00c.
Tinned soft Bessemer	9.50c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE	
High Brass Sheet	28¼c. to 29½c.
High Brass Wire	28¼c. to 29½c.
Brass Rod	26¾c. to 29 c.
Brass Tube	42½c. to 44½c.

Copper Sheets

Sheet copper, hot rolled, 16 oz., 29½c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14x20		
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20		Primes	Wasters
		80 lb...	$9.80	$9.55
		90 lb...	9.90	9.65
		100 lb...	10.00	9.75
IC...$15.00	$13.00	IC...	10.25	10.00
IX... 17.25	15.00	IX...	11.25	11.00
IXX... 19.00	16.75	IXX...	12.25	12.00
IXXX... 20.75	18.50	IXXX...	13.25	13.00
IXXXX... 22.25	20.25	IXXXX...	14.25	14.00

Terne Plates

8-lb Coating 14x20	
100 lb.	$9.35
IC	9.50
IX	10.50
Fire door stock	12.75

Tin

Straits pig	66c.
Bar	70c. to 75c.

Copper

Lake ingot	21c. to 22c.
Electrolytic	20c. to 21c.
Casting	19½c. to 20c.

Spelter and Sheet Zinc

Western spelter	10½c. to 11½c
Sheet zinc, No. 9 base, casks	14c. open 14½c.

Lead and Solder*

American pig lead	9½c. to 10½c.
Bar lead	10½c. to 11 c.
Solder ½ and ½ guaranteed	43c.
No. 1 solder	40c.
Refined solder	36c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	90c.
Commercial grade, per lb	50c.

Antimony

Asiatic	12½c. to 13½c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb...35c. to 38c.

Old Metals

The market is quiet. Dealers' buying prices are nominally as follows:

	Cents Per lb.
Copper, heavy and crucible	17.50
Copper, heavy and wire	16.50
Copper, light and bottoms	15.00
Brass, heavy	11.00
Brass, light	8.00
Heavy machine composition	16.25
No. 1 yellow rod brass turnings	10.00
No. 1 red brass or composition turnings	13.00
Lead, heavy	7.00
Lead, tea	4.75
Zinc	5.25